VA Center for Applied Systems Engineering (VA-CASE)

3-Year Report

February 7th, 2012

Message from the VA-CASE Co-Directors

In the span of the last 32 months, the VA Center for Applied Systems Engineering (VA-CASE) has progressed from a funded proposal to a fully operational applied health systems engineering center.

With this 3-year summary report – we'd like to recognize and celebrate the remarkable accomplishments of the VA-CASE staff and faculty, our academic partners, Wayne State University, University of Michigan–Ann Arbor and Purdue University, as well as the considerable support of our many VHA partners – including the CBO Purchased Care Program, the Optimizing Cancer Care Collaborative Steering Committee, National PACT Steering Committee, National Office of Specialty Care, National Surgery Office (NSO) and the HIV/AIDs and Stroke QUERI Centers.

We would also like to express our sincere gratitude to our sponsors – the Indianapolis, Ann Arbor and Detroit VAMC Leadership teams, the VISN11 Leadership team, led by Mr. Mike Finegan and the VHA National Systems Redesign Program Office, led by Dr. Mike Davies.

With your continued support, we are confident that during the next 3 years we will continue our journey in support of the transformation of VHA healthcare.

Heather Woodward-Hagg

Heather Woodward-Hagg
Co-Director

Mary Sherrill

Mary Sherrill
Co-Director

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I. Executive Summary

A. Center Overview

The ***VA Center for Applied Systems Engineering (VA-CASE)*** is an interdisciplinary Veterans Engineering Resource Center (VERC) built on a philosophy of *partnership* of Operational Systems Engineering (OSE) faculty with VHA administrative and clinical management and staff. Our center leverages the significant expertise present within VHA medical centers and affiliated academic partners in operational systems engineering, informatics and implementation science to facilitate transformation within VHA healthcare delivery systems.

Within ***VA-CASE,*** we strive to be a model for *integration* of OSE among clinical, administrative, operations, academic, and research partners within VA healthcare at the local, regional, and national levels. This focus on integration, rather than consultative engagement, ensures that VA-CASE faculty and staff respond to genuine VHA priorities in order to develop innovative methods for applying OSE to improve healthcare for veterans.

B. Highlights

Our focus has been building the technical and administrative foundation to enable and facilitate development and diffusion of OSE innovation in future years.

Over the course of the last 3 years, we have progressed from a funded proposal to a fully operational center with over 75 funded staff and faculty. We have worked to insure a robust pipeline of VHA engineers through the development of engineering internship programs with our academic affiliates and the direct hire of 39 BS/MS/PhD level Industrial and Systems Engineers.

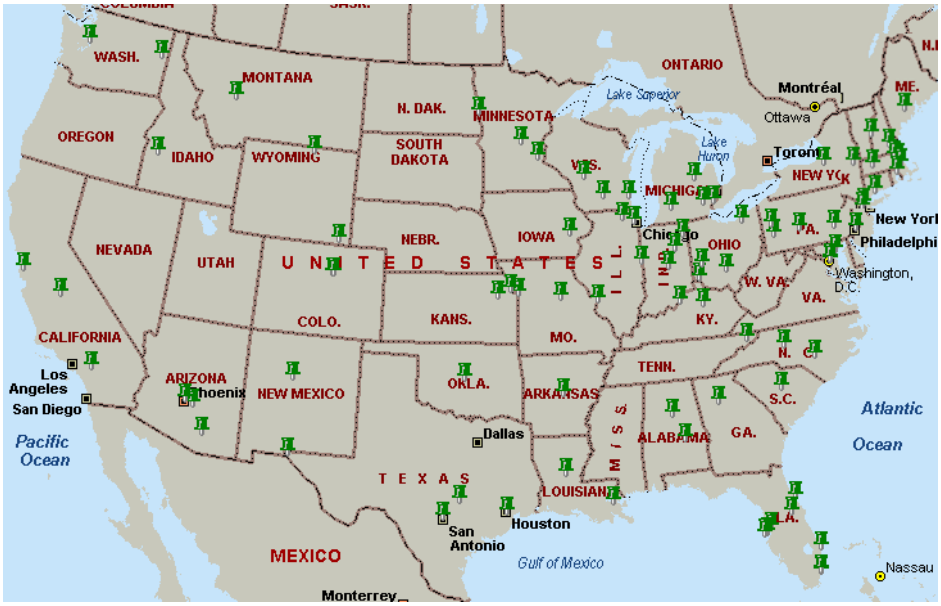
During this time period, VA-CASE has provided over an estimated 10,000 days of Industrial, Systems Engineering and Informatics support across 90 VA facilities, 10 VISN offices and 5 VHA National Program offices with an estimated cost savings of over $7.0M over externally contracted engineering services. The type of expertise provided has ranged from faculty presenters to development of sophisticated models for the Health Administration Center claims processes and VISN11 Telephone Call Centers.

We have produced several products and programs with significant national impact. The Purchased Care Non-VA Care Coordination and FBCS pilots have informed national roll-out of Purchased Care programs. The Dialysis Make/Buy model, produced in partnership with VISN6, informed national VHA leadership decision making with respect to management of dialysis patients, resulting in an estimated savings of $8M in non-VA dialysis care costs annually. The VA-CASE/Purdue Lean Certification and Training Program has trained over 5700 VA staff in Lean/SR/OSE principles and methods and has become the model for VHA Lean training nationally, with an estimated cost savings of over $5.7M when compared to external Lean Training consultant rates. The Interactive Visual Navigator (IVN), developed by our Wayne State Faculty and the Detroit VAMC, has become the basis for an integrated, fully automated solution within Reusable Medical Equipment (RME) Processing.

Additionally, we have established five autonomous VA-CASE Program Offices – Purchased Care (Fee Services), Collaborative Programs, Informatics Programs, Professional Development Programs and the VHA Engineering Technical Assistance Programs (VE-TAP) to allow future growth and innovation moving forward into FY12+.

C. Site Map of VA-CASE Engagement/Support/Training by VHA Facility/VISN Office

The US map below indicates the VHA facilities and VISN offices where VA-CASE staff and faculty have provided on-site engineering and/or informatics consultation, training or project team support. Note that individual markings may indicate multiple engagements. As outlined in Appendix D, over 170 distinct on-site engagements (engineering and/or informatics consultation, training or project team support) have been conducted by VA-CASE staff and faculty across over 90 VA facilities, VISN offices and National VHA program offices.



Denotes VA-CASE Industrial Engineer or Informatics **on-site** support/training or engagement activity, individual markings may indicate multiple engagements (detailed breakdown by program in Appendix D)

D. FY12+ Plans

Our focus for FY12+ will be to continue efforts to direct our center toward a sustained, customer-oriented Veterans Engineering Resource Center within VHA.

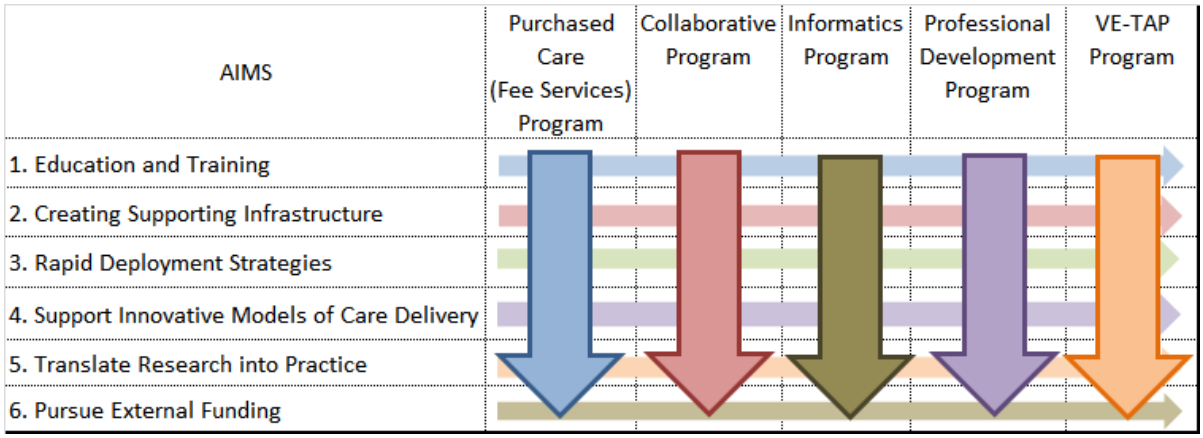
Within FY12+, we will leverage existing partnerships continue development and management of a balanced portfolio of projects (i.e. Project Pipeline) within each of our programs that will continue to support rapid project development from proof-of-concept to national dissemination in 12-18 month cycles. We will strive to create and facilitate a culture that will foster innovation amongst our staff and faculty, yet insure commitments to customers are fulfilled and projects are supported through to national dissemination.

II. VA-CASE Mission/Vision

The focus of our center is to integrate OSE within VA healthcare delivery systems in order to promote systems improvement and to support implementation of innovative models of care delivery. The vision for our center is to become a catalyst enabling collaboration among clinical and administrative operations, academic, and research partnerships within VA healthcare at local, regional and national levels.

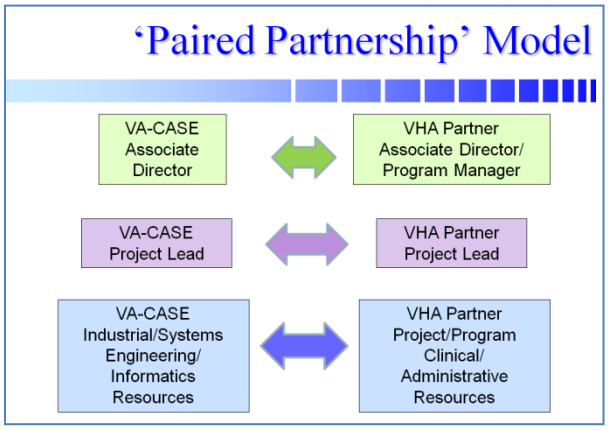
A. Specific AIMs

1. Develop and implement training and educational programs based in OSE disciplines, methods and tools.
2. Optimize the VHA administrative infrastructure to allow integration of OSE resources into the executive leadership, operational and clinical management structure of VHA facilities.
3. Deploy rapid implementation strategies, utilizing OSE techniques such as Lean and Six Sigma, to enhance implementation and spread of transformed delivery processes.
4. Design, test and implement new clinical and administrative processes that support the development and implementation of innovative models of care delivery.
5. Support implementation, effectiveness and evaluation research that enables more rapid translation of clinical and health services research into practice, promotes innovation in operational processes and enhances partnerships with researchers.
6. Pursue external, non-VA funding to support implementation and research of operations systems engineering (OSE) within VISN11 and the rest of VHA.



B. VA-CASE Partnerships

VA-CASE staff and faculty consider our on-going partnerships with VHA National Program offices as well as our academic affiliates to be integral to the successful integration of OSE within VHA healthcare delivery systems. VA-CASE utilizes a 'Paired Partnership' model to align and integrate our resources with partner resources at all levels of the organization as outlined in the graphic below.



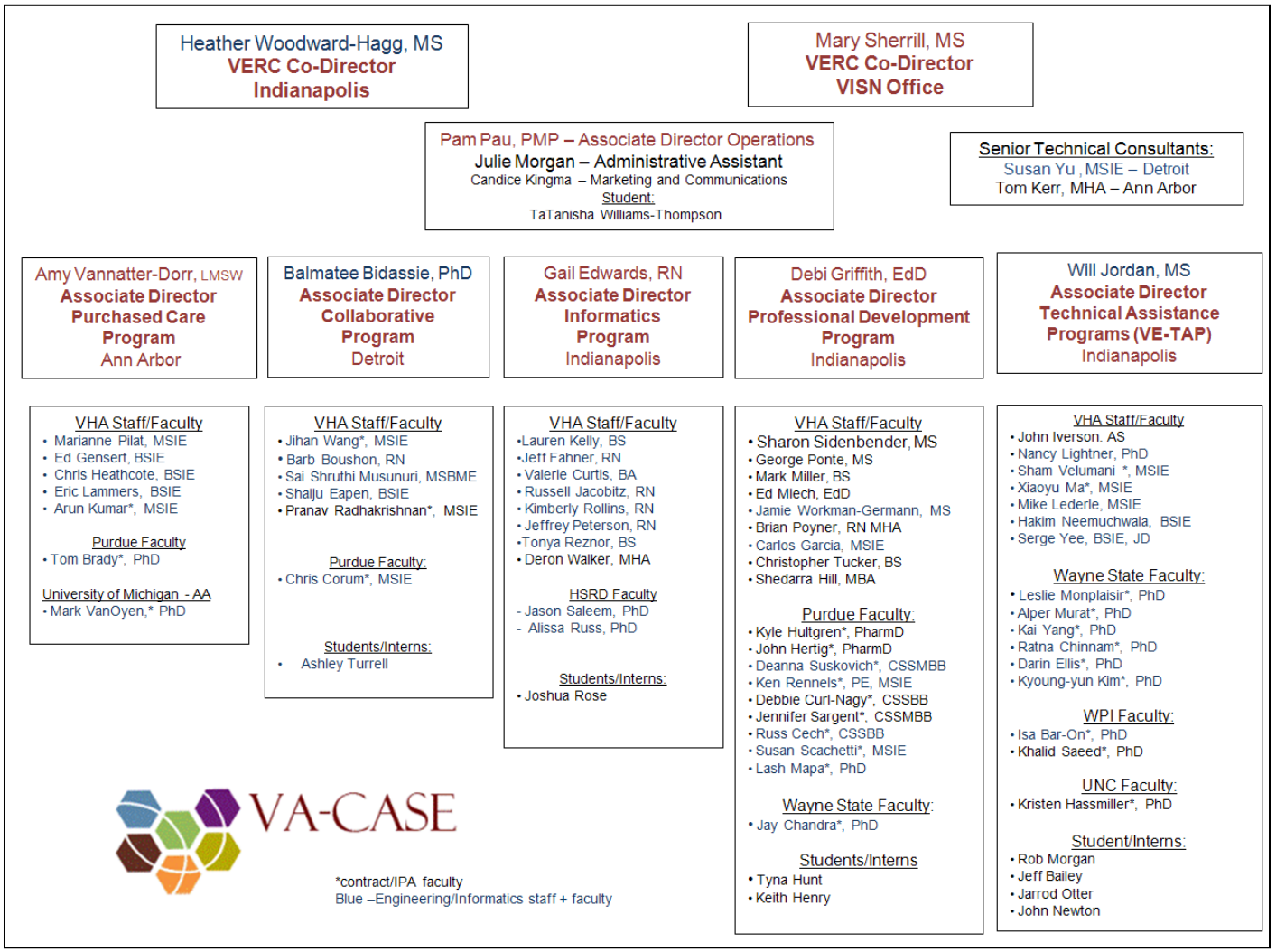
The initial partnerships with VISN11 VISN office and facilities, the VHA Purchased Care Program and the VHA Optimizing Care Committee as well as with our academic affiliates at Wayne State University (WSU), University of Michigan (UM), and Purdue University, Indiana University were formed during the initial VA-CASE proposal writing process and have continued to date.

Throughout FY11+, we have worked to expand both the VHA and academic affiliate relationships to insure a continuous stream of non-core funding as well as Industrial/Systems and Informatics capacity to meet our customer needs.

Letters of support from our VHA and academic partners, as well as other key stakeholders, can be found in Appendix C. A current outline of VHA and academic and affiliate partners are shown below.

VHA Partners	Academic/Affiliate Partners
• VISN 11 • VHA Purchased Care Program Office (CBO) • VHA Optimizing Cancer Care Committee • National Office of Clinical Consultation and Compliance (OCCC) • National PACT Steering Committee • National Office of Specialty Care • National Surgery Office (NSO) • National Real Time Locating Systems Program Management Office (RTLS PMO)	
• VA Ann Arbor HCS	• University of Michigan (UM) College of Engineering
• Detroit VA Medical Center	• Wayne State University
• Indianapolis VA Medical Center • VA HSR&D Center • Stroke QUERI • HIV/AIDs QUERI	• Regenstrief Institute • Purdue Center for Medication Safety Advancement • Purdue School of Engineering & Technology • Indiana University School of Medicine • Worcester Polytechnic Institute • University of North Carolina (UNC)– Chapel Hill

C. Organizational Chart



III. Progress Against AIMs

AIM1: Develop and implement training and educational programs based in OSE disciplines, methods and tools.

Throughout this time frame, the focus of VA-CASE training and educational programs has been the development, dissemination and evaluation of OSE, Lean, Systems Redesign and Clinical Informatics training programs for Senior Executive, Management and front-line clinical and administrative staff. Within our education programs, interdisciplinary teams composed of VHA and VERC staff partner with faculty from our academic affiliates, adapt traditional training curriculum to VA-specific requirements and develop innovative techniques for integrating accelerated learning methods.

Significant Accomplishments:

- The VA-CASE/Purdue Lean Training, Education and Certification Programs were developed and disseminated at the Yellow Belt (Practitioner), Green Belt (Facilitator) and Black Belt (Program Manager) and Senior Executive levels. From FY09-present, over 5700 VHA staff and faculty participated in these programs across more than 50 facilities and national offices. In late FY10, this program became the model for VHA Lean Education for the national VERC program.

- The VA-Informatics Development and Education Academy (VA-IDEA) Program was developed and disseminated to provide training for Clinical Applications Coordinators (CAC) in basic and advanced Clinical Reminder techniques. To date, over 298 CACs from 101 facilities have participated in VA-IDEA clinical applications training programs.

- VA-CASE provided primary OSE support for the FY10-11 national SR Improvement Advisor Academy (IAA) programs, providing OSE training and project mentoring to over 60 participants.

- In FY11, VA-CASE was awarded the contract to provide primary coordination, planning and faculty support for the FY11/FY12 Systems Redesign Executive Workshop entitled "Leading Organizational Improvement." This program provides instruction in effective SR and OSE techniques for all VHA Senior Leaders throughout FY11/12. To date, 10 VISN offices have participated in this program with over 400 VHA Senior Executive participants.

Performance Metrics:

- #/Type of OSE Training Programs developed and disseminated:
  - 3 primary programs: 1) Lean Education/Certification Program, 2) VA-IDEA Program, 3) Leading Organizational Improvement (LOI) Program

- # of participants/facilities for OSE Training Programs:
  - Lean Education and training: 5700 participants/51 facilities
  - VA-IDEA: 298 participants / 101 facilities
  - Leading Organizational Improvement (LOI): 400 participants/10 VISN offices

- Cost Benefit to VHA: approx $5.7M (as compared to training costs for external programs)

AIM2: Optimize the VHA administrative infrastructure to integrate OSE resources into the executive leadership, operational and clinical management structure of VHA facilities.

VA-CASE support for optimizing this AIM has focused on three primary areas: 1) building healthcare-based OSE capacity through active recruiting and effective staff development, 2) supporting development of more robust informatics infrastructure and 3) initiating and supporting programs that facilitate executive leadership engagement in OSE.

VA-CASE has completed several key projects, such as the CBO funded Dialysis, GI procedures and Polysomnography Make/Buy tools and the HAC Claims Processing Simulation model. These projects have resulted in the development of new tools for OSE-informed decision making at the highest levels of VHA.

Additionally, VA-CASE has provided primary OSE support to several high visibility national initiatives, including the Disability Evaluation System and VACO (10N) Correspondence Improvement and Tort Claims Process redesign projects.

Significant Accomplishments:

- VA-CASE successfully recruited and hired 39 BS/MS/ PhD level Industrial Engineers. Of those positions, retention is 87% (34/39).

- VA-CASE established an engineering internship program with multiple academic partners, resulting in 15 Industrial Engineering student interns. Eight of the 10 (80%) of the engineering student interns that have graduated were hired into VHA (VERC and Facility) positions upon graduation.

- VA-CASE successfully launched the VA-CASE Informatics Programs with oversight of the VA-IDEA training program and informatics support. In FY09-present, this program provided over 1000 days of core funded informatics programming support within VHA.

- VA-CASE partnered with VISN6 to create a Dialysis Make/Buy Tool that informed the national VHA decision to invest in the construction of 4 stand-alone VHA Dialysis Centers, with an estimated savings of $8M annually compared to FY09 contract rates.

Performance Metrics:

- Informatics support provided (days): 1000 days
- # of engineers hired into VHA/retention rate: 39 hires, 87% retention rate
- # of student engineer interns hired into VHA (VERC/non-VERC): 7 VERC/ 1 VHA

- Cost Benefit to VHA:
  - Make/Buy Dialysis: estimated $8M savings for internal compared to contract rates for dialysis
  - Cost Benefit to VHA: approx ~1.0M (as compared to costs for external consultant support)

AIM3: Deploy rapid implementation strategies to enhance implementation and spread of transformed delivery processes, utilizing OSE techniques such as Lean and Six Sigma.

Primary support for this AIM comes from the VA-CASE Professional Development and VHA Engineering Technical Assistance (VE-TAP) Programs. The Professional Development Program provides local and national capacity in coaching interdisciplinary teams in application of rapid implementation strategies, such as Lean and Six Sigma, to improve and optimize current administrative and clinical delivery processes utilizing training and innovative methods developed in AIMs 1-2 and facilitating implementation of transformed delivery processes outlined in AIM4.

In addition to providing expertise in coaching front-line staff teams and VA leaders in OSE, VE-TAP is also pioneering the use of rapid cycle implementation strategies such as Knowledge Management, Rapid Prototyping and Agile Program Development.

Significant Accomplishments:

- VA-CASE faculty provided over 160 days of RPIW coaching and mentoring across 12 facilities/VISNs + 2 National Program Offices (16 project teams) and 280 VHA staff. Sites supported include:
    - VISN4 – Philadelphia VAMC: Missed Opportunities Reduction (in collaboration with VAPHS VERC)
    - VISN7 – Atlanta VAMC: Substance Abuse Treatment Clinic Lead Time Reduction
    - VISN8 – Orlando VAMC: Outpatient Pharmacy Pickup
    - VISN10 – Surgical Capacity Optimization
    - VISN10 – Chillicothe VAMC: EKG Ordering and Completion Process
    - VISN11 – Non-VA Care Coordination RPIW
    - VISN19 – Helena VAMC: Reduce the cycle time of scheduling, completing and communicating mammograms within five Montana medical centers
    - VISN20 – Anchorage VAMC: Design, optimization and alignment of administrative and business processes with patient aligned clinical service optimization and alignment
    - VISN20 – Spokane, WA Behavioral Health Services Care Coordination and Teamwork Optimization
    - VACO: Disability Evaluation System RPIW
    - VACO: Tort Claims Process RPIW

- Knowledge Management: The Lung Cancer, Prostate Cancer and PACT Improvement Resource Guides were developed, piloted and disseminated as part of the VHA Lung Cancer Special Study and PACT National Collaboratives in partnership with the HIV/AIDs QUERI. These web-based tools provide a central location for Systems Redesign teams to manage and share information related to timeliness and reliability improvement of the continuum of Cancer Care. These sites have received over 2400 unique users since their launch in Sept. 2010.

- Rapid Prototyping Methods: The Interactive Visual Navigator (IVN) went from design to pilot in less than 9 months due to the use and application of innovative rapid prototyping methods, such as Continuous Engineering Development (CED), a rapid prototyping method translated into a VHA setting through our partnership with Wayne State University. Additional investigation of application of rapid prototyping strategies is on-going in partnership with the Stroke QUERI.

- Agile Software Development: VA-CASE staff and faculty, in partnership with WSU and Purdue, are currently utilizing the Agile Software methodology for iPhone application development. This methodology is based on rapid cycle, iterative and incremental development processes. Agile software development principles are compared to Lean thinking by delivering the right thing to the people who want it, in a timely fashion and in usable form.

- Dissemination/Diffusion Mechanisms: As outlined in Appendix A, VA-CASE Faculty and Staff have produced 20 peer reviewed journal and proceedings publications, 2 Books/Book Chapters and have 44 documented presentations related to VA-CASE initiatives. This includes 1 plenary presentation and 1 award finalist.

- Performance Metrics:

    - RPIW Coaching and Mentoring (Facilities/Days): 16 RPIW Events/10 VHA VISN/Facilities + 2 National Program Offices, 160 days
    - # of other Rapid Implementation strategies developed/disseminated – 1) Knowledge Management - Improvement Toolkits, 2) Rapid Prototyping, 3) Agile Software Development
    - # of presentations/publications: 20 peer-reviewed or refereed publications, 44 presentations, 1 Book, 1 Book Chapter

Cost Benefit to VHA: $.5M savings (as compared to external consulting support)

AIM4: Design, test and implement new clinical and administrative processes that support the development and implementation of innovative models of care delivery.

VA-CASE has provided significant support to national VHA programs in developing and testing innovative strategies for redesign, evaluation and characterization of optimal VA clinical and administrative processes. As outlined in our initial proposal, the initial focus areas for work in this area were selected based on current national priorities: #1) Cancer Care Delivery and #2) Purchased Care Fee Services. Throughout FY10, multi-disciplinary teams were established within each of these focus areas utilizing clinical, administrative and OSE staff and faculty.

In AIM4, project teams work to fundamentally redesign administrative and clinical processes to optimize quality, timeliness and cost of healthcare delivery. Pilots of innovative processes developed and tested within the FY09-11 project cycle (Re-Usable Medical Equipment, Fee Basis Claims System Software, Non-VA Care Coordination, and Telephone Care) were completed and are in national roll-out.

Significant Accomplishments:

- VA-CASE successfully partnered with the National VHA Optimizing Cancer Care Collaborative Steering Committee to apply OSE/SR methods to VA Cancer Care Collaboratives. To date there have been three Collaborative Phases – Phase 1: Jan. 2009-Jan. 2010, Phase 2: Jan. 2010 - Jan. 2011, and Phase 3: June 2011-February 2012. VERC engineers have provided over 1200 days of on-site IE support across 57 Phase I/II/III teams. Results from the Phase I/II Collaboratives showed that ~78% of AIMS were met with over 60% of teams improving timeliness and quality of care greater than 40% as compared to baseline.
- In partnership with the National Chief Business Office (CBO) Purchase Care Program, VA-CASE completed the FY09 Fee Process Evaluation Project, a multi-site evaluation of automated and manual claims processing methods nationally. The findings from this study became the basis for identification of VA-CASE FY10/11 Purchased Care Program projects. Both the Non-VA Care Coordination and FBCS Optimization Projects were chartered based on the evaluation study. Additionally, this study helped inform the national roll-out of the of the automated Fee Basis Claims System (FBCS) claims processing system.
- VA-CASE faculty from Wayne State University, led by Dr. Kai Yang, successfully developed, prototyped and piloted the Interactive Visual Navigator (IVN) for RME processing. This automated and dynamic work flow process incorporates systems and human factors engineering principles to ease the burden on the technician, reduce error in re-processing, and provide automated data collection. The foundation of this system is the digitized, human factors-based SOP display.
- VA-CASE faculty from Wayne State, led by Dr. Ratna Chinnam, successfully partnered with the VISN11 Health Systems Board to create a mathematical model to determine minimum estimated staffing requirements to meet new VA telephone service level goals under different operational scenarios. Presentation of these results resulted in the design of a 'hybrid' VISN11 and national call center model. This model is currently in pilot within VISN11.

Performance Metrics:

- Industrial Engineering/Informatics support provided (days): over 7800 days
- # of redesigned processes proto-typed/tested, in pilot, and fully implemented: Optimizing Cancer Collaborative – 38 sites in pilot/fully implemented , Interactive Visual Navigator – in pilot 5 sites, funded for Phase II, Hybrid VISN11/National Pharmacy Call Center – in Pilot

Cost Benefit to VHA: $5.5M savings (as compared to external consulting support + IVN purchase)

AIM5: Support implementation, effectiveness and evaluation research that enables more rapid translation of clinical and health services research into practice, promotes innovation in operational processes and enhances partnerships with researchers.

During FY09-11, VA-CASE worked to broaden existing collaborations to connect operational improvement and clinical researchers in the VA to VERC faculty and staff. We leveraged the research expertise at our participating facilities by: (1) identifying and implementing evidence-based improvements in the delivery of healthcare, especially those developed and tested by our faculty; (2) designing strategies for implementing VERC initiatives that facilitate their adoption based on findings from the field of implementation science; (3) identifying opportunities for complementary research funding; and (4) developing research proposals for projects of mutual interest between the VERC and research centers.

Significant Accomplishments:

- VA-CASE/HSRD faculty Dr. Ed Miech and Dr. Debi Griffith launched the Audience Response System (ARS) real-time evaluation and feedback tool in June 2009 and within months ARS had become a model for real-time evaluation and feedback at regional and national VA conferences, with over 40 facilities acquiring ARS systems independent of VA-CASE since FY10.

- Dr. Edward Miech, completed development and validation of Lean and Systems Redesign knowledge requirement and competencies at the Practioner, Facilitator, Program Manager and Senior Executive through the use of a modified Delphi validation methodology. This work then became the basis of the VA-CASE Lena Training and Certification Programs.

- The "context matrix" approach, developed by VA-CASE/HSRD faculty member Dr Edward Miech, was piloted as part of the VA Cancer Care Collaborative. This innovative method for capturing, organizing, and analyzing large amounts of unstructured data – both quantitative and qualitative –is part of the FY10 funded QUERI study called "RE-INSPIRE," a 3-year Service-Directed Project (SDP) with a total budget of $946K.

- VA-CASE co-funded HSRD investigator Alissa Russ to develop, test and implement a Rapid Usability Evaluation Protocol (RUE) for operational evaluation of re-designed and newly-created CPRS applications. This protocol is currently in use in the Indianapolis VAMC and several papers were published and presented detailing the protocol.

- VA-CASE partnered with the HIV/AIDs QUERI to develop, pilot and disseminate the Lung Cancer Improvement Resource Guide as part of the VHA Lung Cancer Special Study. This web-based tool has received an average of over 110 hits per day since its launch in Sept. 2010.

- In July 2010, VA-CASE partnered with the HSRD/QUERI community to host a national VA field-based meeting - "Quality Improvement in Parallel Circuits" - to explore the interfaces and opportunities for collaboration between HSRD, QUERI, Systems Redesign and OSE.

- VA-CASE partnered with clinical researchers from the IU SoM to implement and evaluate the Geriatric Resources for Assessment and Care of Elders (GRACE) model for home based geriatric assessment and care management to the Roudebush VAMC. VA-CASE provides program

management, analysis and clinical informatics resources to this program. To date, over 170 patients have been enrolled in this program with outcomes showing 35% reduction in 30-day readmission rates and 33% reduction in mortality rates (May 2011 data).

Performance Metrics:

- Joint HSRD/VERC funded faculty: 4 Investigators (Miech, Griffith, Russ, Saleem), 2 Clinical Applications Coordinator (Fahner, Jacobitz), 3 staff/faculty (Sidenbender, Kingma, Russell)

- # of research proposals submitted including VERC faculty: 5 – RE-INSPIRE (funded), GRACE (funded), Tech4Impact (funded), HIV/AIDs QUERI Tool Facilitation (not funded), RVAMC CREATE/COIN Proposal (not funded).

- # of HSRD/QUERI/SDP proposals submitted by VERC faculty: 1 – RE-INSPIRE (approved; 3-year SDP with total budget of $946K, projected start in Apr. 2011)

AIM6: Pursue external, non-VA funding to support implementation and research of operations systems engineering (OSE) within VISN 11 and the rest of VHA.

VA-CASE and our partners are pursuing funding and resources from other organizations that fund engineering research, healthcare research, and healthcare operations improvement. In future years, we anticipate pursuing funding in partnership with engineering, medicine, nursing, and other academic programs at Purdue University, University of Michigan, Wayne State University, and other academic affiliates. Examples of potential funding sources include: Agency for Healthcare Research and Quality (AHRQ), Blue Cross organizations, Institute of Medicine (IOM), National Science Foundation (NSF), and Robert Wood Johnson Foundation (RWJF).

Significant Accomplishments:

- VA-CASE partnered with the IU School of Medicine Geriatrics program to submit a Tech4Impact Proposal to the Indiana Center for Technology and Aging to provide additional VERC clinical assistance and program management to the VA- funded GRACE study. Our goals under the Tech4Impact Diffusion Grants Program are twofold. The first goal is to enhance current activities of care planning, tracking, and communication; the second is to use computer-based technologies to facilitate program evaluation ensuring fidelity to the GRACE model and measuring quality of care indicators. Ensuring fidelity to the GRACE model and demonstrating improvement in quality of care indicators will be critical to the sustainability of GRACE in the Indianapolis VAMC and to the eventual dissemination of GRACE nationally within the VA healthcare system. These functions will also serve to guide and improve overall program quality.

- # of non-VA (external) grants submitted/funded: 1 Tech4Impact (funded) $100,000

IV. Program Overviews and Highlighted Projects

Upon the initiation of VERC funding within June 2009, VA-CASE aligned the focus and specific AIMS of our center with two existing, significant, national VHA programs: the 1) Optimizing Cancer Care (OCC) National Committee and 2) National CBO Purchased Care (Fee Services). As outlined in our initial proposal, each of these partnerships was developed into independent VA-CASE Program Offices (Purchased Care Program and Collaborative Program) with aligned faculty and staff tasked with developing and executing against the highest priority projects for these program offices.

In FY10, partnerships were formed with the VISN11 Telephone Care Collaborative and National Patient Aligned Care Team (PACT) Steering Committee to provide administrative and Systems Engineering support for the VISN11, regional and national collaborative steering committees. Furthermore, during this time VA-CASE partnered with the Stroke QUERI to provide OSE and evaluation supports for the HSRD funded INSPIRE and RE-INSPIRE evaluations. In FY10, the VISN11 Telephone Care, PACT, INSPIRE and RE-INSPIRE initiatives were also aligned under the VA-CASE Collaborative Program.

Additionally, as outlined in our VERC proposal, in FY09, the VA-CASE VHA Engineering Technical Assistance Program (VE-TAP) was formed as an autonomous VA-CASE Program Office tasked with providing systems engineering and administrative support for educational programs, consultative engagements and emergent national priorities. The VERC Lean Education Program was fostered through the development/pilot/dissemination cycle within the VE-TAP Program, as well as our significant work in Re-usable Medical Equipment (RME) Workflow Optimization, including the Interactive Visual Navigator (IVN).

In FY10, a stand-alone VA-CASE Informatics Program was added to better manage shared informatics and clinical application resources and expertise across the VERC programs. In FY11, the VERC Lean Education Program was expanded to a fully autonomous Professional Development program.

A brief outline of our current program structure is outlined below (additional detailed information is in follow-on sections):

A. Purchased Care Program: Partnership with National CBO Purchased Care Program, scope includes decision for external referral for services to claims processing and payment for services.

B. Collaborative Program: Partnerships with National Optimizing Cancer Committee, National PACT Steering Committee, VISN11 Telephone Care Collaborative Steering Committee, Stroke QUERI, National Office of Specialty Care, National Surgery Office (NSO).

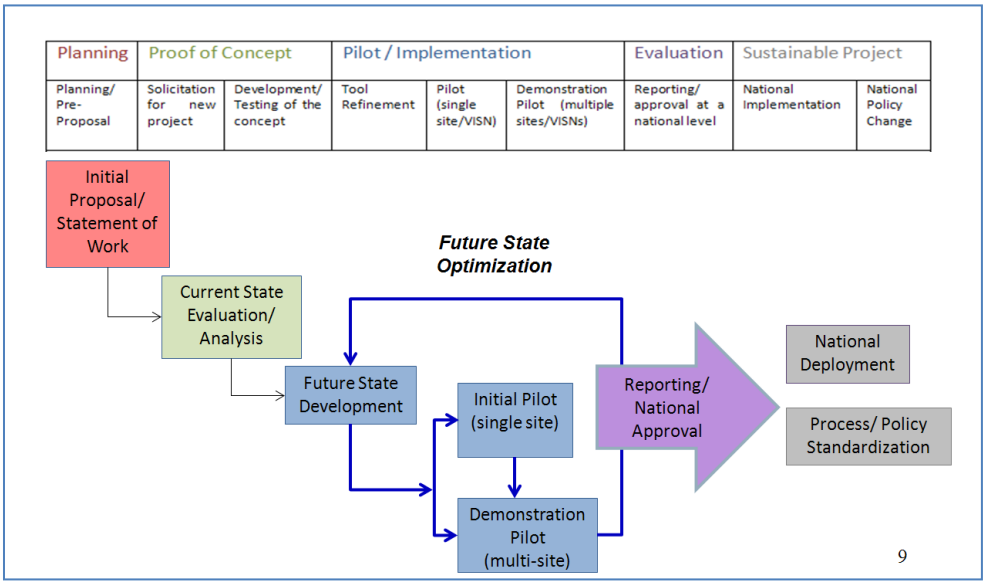
C. Informatics Program: Provides management and oversight of VA-CASE informatics and clinical applications resources across VERC programs.

D. Professional Development Program: Provides administrative and systems engineering support for educational programs, including the VA-CASE Lean and Lean Six Sigma Programs in partnership with the MWM VERC.

E. VE-TAP Program: Provides administrative and systems engineering support for consultative engagements and emergent national issues, acts as "incubator" for VA-CASE innovations through concurrent engineering cycles.

As shown in the graphic below, VA-CASE utilizes a formal, rapid-cycle project development and implementation approach for each primary program. The stages of this pipeline are outlined below:

1. Planning: During the planning phase, initial proposals and statements of work are developed and vetted through program review processes.
2. Proof of Concept: Within this phase, current state analysis and evaluation is completed and an initial future state is developed.
3. Pilot/Implementation: Following future state development, testing is conducted in progressively more complex environments (single site to multiple site), with continuous feedback to inform optimization of the future state.
4. Evaluation/Reporting: Reporting and national approval for the optimized future state is obtained.
5. Sustainable Project: National implementation, reporting/auditing and policy changes are implemented as appropriate.

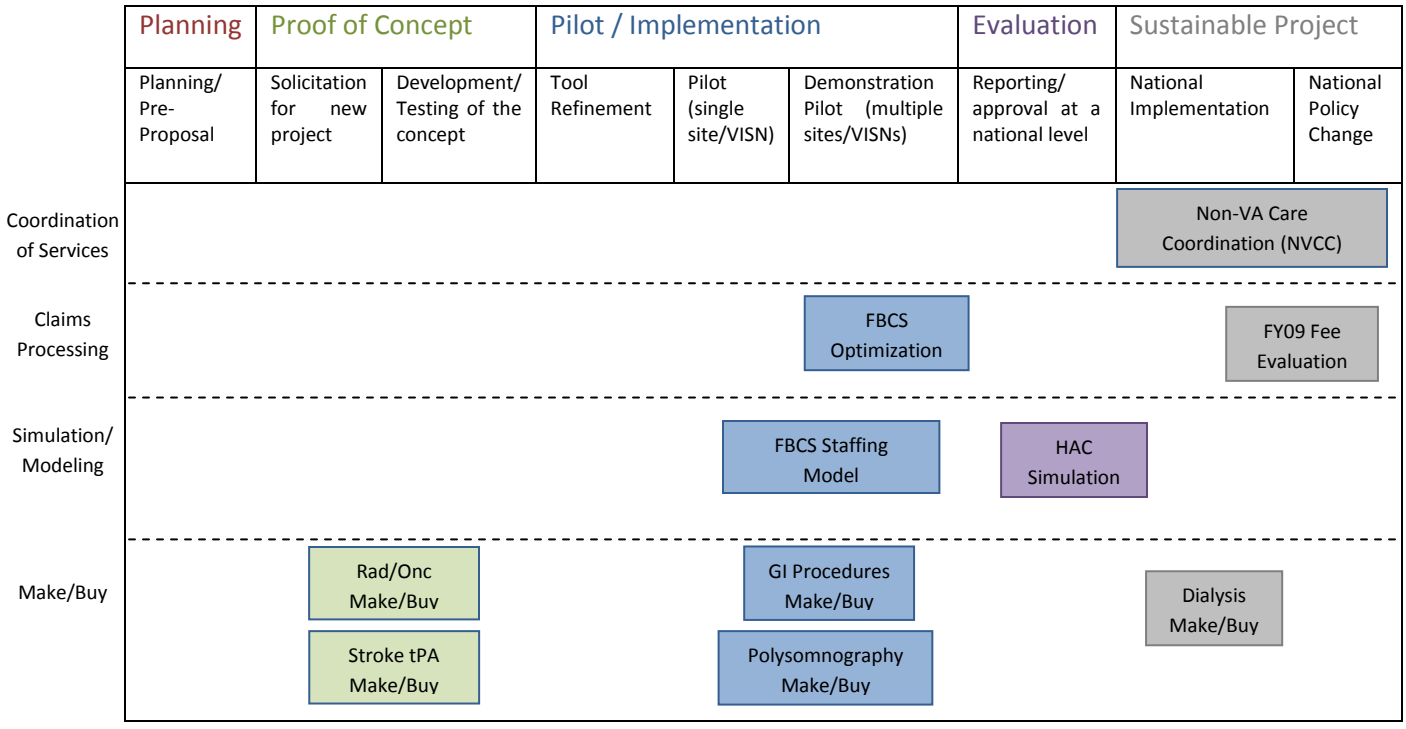


A. Purchased Care Program

The Veteran's Administration Center for Applied Systems Engineering (VA-CASE) Purchased Care Program is a partnership with the National CBO Purchased Care Program. In FY09-FY11 VA-CASE Purchased Care Program budget was approximately $1.0M per year, with 50% (about $500K/year) allocated from VA-CASE core funds.

The Purchased Care Program works with the CBO in collaboration with station level Non-VA Care offices to design, develop, test, and implement standardized optimized business processes across the enterprise. This program works to integrate applied systems redesign (SRD) / operational systems engineering (OSE) principles into everyday business practices throughout the Veterans Health Administration (VHA) Purchased Care system. The Purchased Care Program consists of four teams: (1) Front End - Coordination of Services; (2) Back End - Claims Processing; (3) Simulation and Modeling; and (4) Make/Buy. Each team specializes in the delivery of SRD/OSE tools to increase efficiency, effectiveness, accountability, accuracy and standardization of workflow and decision making. At the core of our current projects are the outcomes of the FY09 Fee Process Evaluation Project.

VA- CASE Purchased Care Project Pipeline



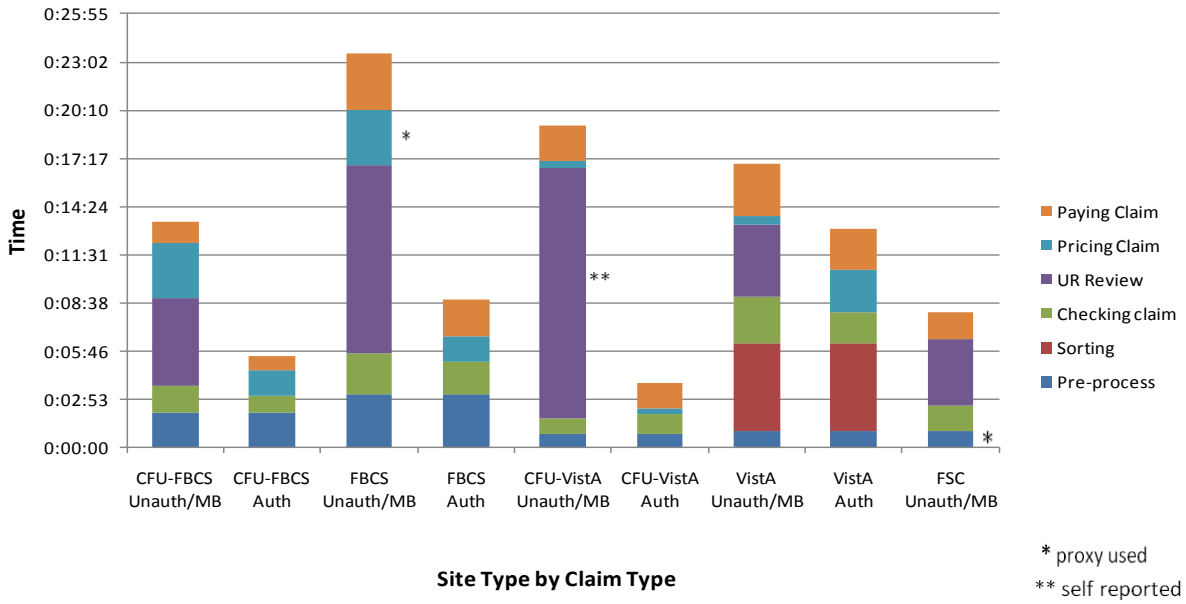
FY09-11 Purchased Care Program Project Summary:

FY09 Fee Process Evaluation Project: This project was a multi-site evaluation of automated and manual claims processing methods nationally within VHA, which started in Feb. 2009 and concluded in Jan. 2010.

Project Objectives: The objectives of this project were to benchmark best practices within thirteen VHA claims processing sites, collect in-depth process performance information, and evaluate overall efficiency, operations management and cost metrics. The team also reviewed the operational methods at each Fee claims processing site to identify any issues related to equity, access to care and patient privacy. This evaluation and analysis was intended to inform the design, test and implement next generation non-VA care processes.

Project Results: This evaluation revealed that significant variability and inefficiencies exist within claims processing in the VA. The use of only one key metric to judge the success of the process - *percent of claims processed within 30 days*- resulted in process behavior that did not value quality, cost or efficiency of the output. Ultimately, this resulted in a higher total process cost, erosion of customer satisfaction, potential violation of regulations and a frustrated workforce. The root causes of these problems were traced to: highly manual claims processing systems which were poorly integrated with clinical processes, lack of process standardization, and insufficient metrics to drive the correct behavior of management groups and frontline staff within non-VA care processes.

Project Impact: The findings from this study became the basis for which all FY10 Purchase Care projects were identified – both the Non-VA Care Coordination and FBCS Claims Optimization Projects were chartered based on the evaluation study. Additionally – this study helped to inform the national roll-out of the automated Fee Basis Claims System (FBCS) claims processing system.

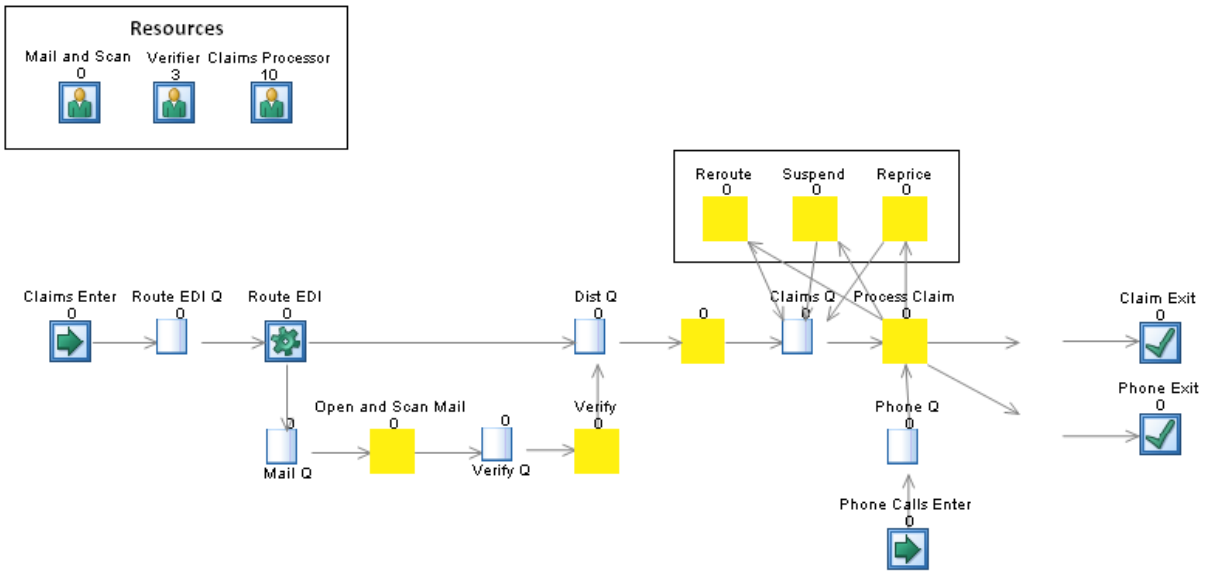


FBCS Staffing Model: A Fee Basis Claims System (FBCS) Simulation Staffing Model was developed by the VA Center for Applied Systems Engineering (VA-CASE) Purchased Care Program. It is a computerized tool that can assist management with decisions regarding staffing capacity for the process of paying non-VA care claims utilizing the FBCS software. Simulation models can be used to determine resource allocation, locate process bottlenecks, and provide visibility into a process. The Model was built with data and insight from the James A. Haley Veterans' Hospital's Fee Center in Tampa, Florida. However, the Model can be used at any VA Fee site that uses the FCBS software by simply adjusting the Model's input values (number of employees, hours worked, claims received, etc.).

Project Objectives: The objective of the FBCS staffing model was to develop a basic, easy-to-use Excel-based model to identify optimal staffing levels as a function of incoming claims volumes following implementation of FBCS.

The FBCS Simulation Staffing Model depicts the claims process in a virtual reality beginning with the Fee Site receiving claims to the claims being paid. The Model can answer a variety of questions. For example - how will the claims process be affected if there is an increase in the number of claims received per week? How will moving an employee from one task to another or a change in the number of staff impact the process flow? Do bottlenecks exist in the process? By answering these types of questions, the FBCS Simulation Model can be used to help management determine the staffing and capacity of their Fee Site prior to actually implementing changes.

Project Results/Impact: This automated Excel-based staffing model has been utilized by the FBCS Claims Optimization team as well as several facility sites to determine optimal staffing levels for FBCS implementation.



FBCS Simulation Staffing Model Screenshot

Non-VA Care Coordination (NVCC) Pilot:

The NVCC Project is one of the VHA Transformational Initiatives (T21 Initiatives). It is a result of the Managing Variation Workgroup chartered by the Under Secretary of Health in March 2010 to identify both business and clinical areas where organizational variation existed and where variation should be reduced or eliminated. One of the identified areas was non-VA care. The CBO partnered with the VA-CASE to develop a future state process that improved the efficiency and effectiveness of the delivery of non-VA care by reducing process variation and improving care coordination. The future state process was developed in conjunction with non-VA care staff from 3 VISN 11 medical centers, as well as with subject matter experts (SMEs) from various Fee Units across the country. NVCC Pilot implementation began in January 2011 at the 3 VISN 11 Pilot Sites and, in June 2011, the fourth Pilot Site, El Paso VA Medical Center, was activated. The Pilot concluded in September 2011.

Project Objectives: The objectives of the NVCC Project were to create standardized business processes for the non-VA care referral process to improve care coordination and to maximize the integration of the front-end of the Fee process and the claims processing software, Fee Basis Claims System (FBCS).

Project Results: VA-CASE developed, monitored and reported the NVCC metrics for all four Pilot Sites. Timeliness and quality outcomes of the completion of key aspects of the NVCC process were tracked. The process areas monitored were: a) creation of the non-VA care referral; b) determination of Veteran eligibility and clinical appropriateness of the requested care; c) referral authorization; d) appointment management; e) receipt and scanning of outside medical documentation; and f) referral closure. These activities were tracked for 60 days beginning from the date the non-VA care referral was entered into the Computerized Medical Record System (CPRS). Additionally, the Clinical Informatics Team collaborated with CBO to develop 30 Non-VA Case CPRS referral templates and 4 Non-VA Care CPRS templated progress notes.

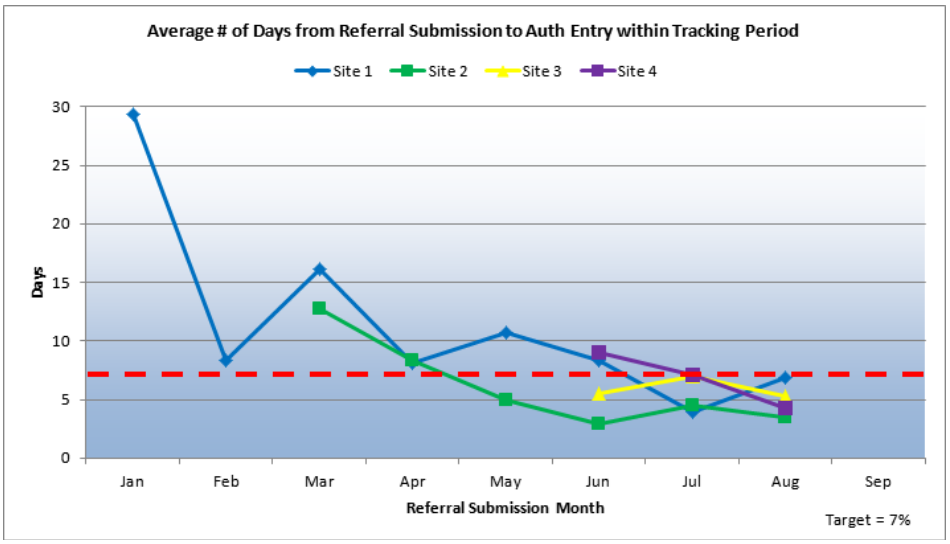
Project Impacts: Improvements in several of the NVCC processes were accomplished at each Pilot Site.

- The average number of days from referral submission into CPRS to the authorization entry into the Fee Basis Claims System (FBCS) decreased at three of the Pilot Sites: a) Site 1 - 77% (29.4 to 6.9 days); b) Site 2 - 73% (12.8 to 3.5 days); and c) Site 4 - 54% (9.0 to 4.2 days). (Graph 1)

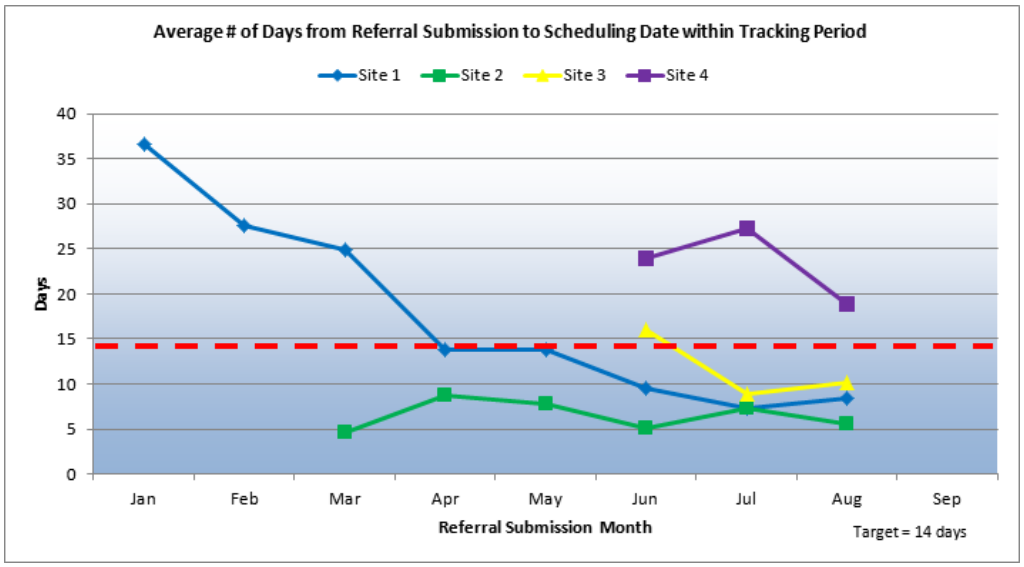
- Three of the Pilot Sites experienced a decrease in the average number of days from the referral submission to the scheduling of a Veteran's appointment: a) Site 1 - 76% (36 to 8.5 days); b) Site 3 - 36% (16.0 to 10.2 days); and c) Site 4 - 21% (23.9 to 18.9 days). (Graph 2)

- Three of the Pilot Sites also experienced a decrease in the average number of days from the date the referral was entered in CPRS to the Veteran's appointment date: a) Site 1 - 45% (54.6 to 30.3 days); b) Site 3 - 26% (34.8 to 25.7 days); and c) Site 4 - 12% (32.1 to 28.2 days). (Graph 3)

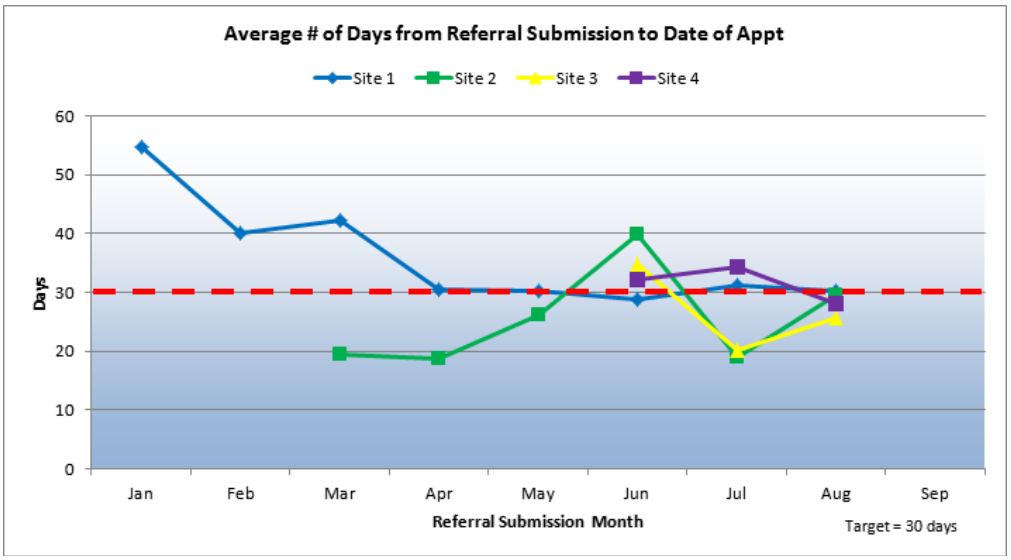
- Based on the Pilot results, CBO decided to nationally deploy the process in FY12. A deployment plan was developed and national implementation began in October, 2011. The Clinical Informatics Team is serving as the national Clinical Application Coordinators to provide assistance and support to the 21 deployment sites for the creation, installation, and use of the NON-VA Care CPRS referral templates and templated progress notes.



Graph 1



Graph 2



Graph 3

FBCS Claims Process Optimization Pilot: In FY10, VA-CASE and CBO collaborated with Subject Matter Experts (SMEs) from various Fee Units across the country to develop standardized business processes for claims processing which optimized the use of the FBCS software. The areas targeted for optimization were those that were identified in the FY09 Fee Process Evaluation Project as frequent bottlenecks in the process. The optimized processes were tested at a pilot Fee site in VISN 8 during FY11.

Project Objectives: The objectives of the project were to develop and test standardized business processes to maximize efficiency and effectiveness of claims processing utilizing the FBCS software. Robust metrics were designed to provide visibility into the optimized process and accountability for the processing of claims.

Project Results: The FBCS Optimization Pilot was conducted from February 2011 through April 2011 at a VISN 8 Medical Center Fee Unit. After the implementation of the optimized process, the Fee Unit experienced an increase in employee productivity and improved timeliness in the processing of claims. Prior to the Pilot implementation, the Fee Unit adjudicated an average of 309 claims per day. Following full implementation of the process, the average number of claims adjudicated per day increased 77% to 549 per day. Since the end of the Pilot, the Fee Unit has sustained approximately a 36% decrease in the average number of days it took from scanning of a claim into FBCS to adjudication from 39.53 days pre-implementation to 25.07 post-implementation.

Average Number of Claims Adjudicated per Day		
January 2011	309	Pre-Implementation
March – September 2011	549	Post-Implementation

Average Number of Days From Scanning to Finalizing for Claims Scanned and Adjudicated Within 60 days		
September – December 2010	39.53	Pre-Implementation
June – September 2011	25.07	Post-Implementation

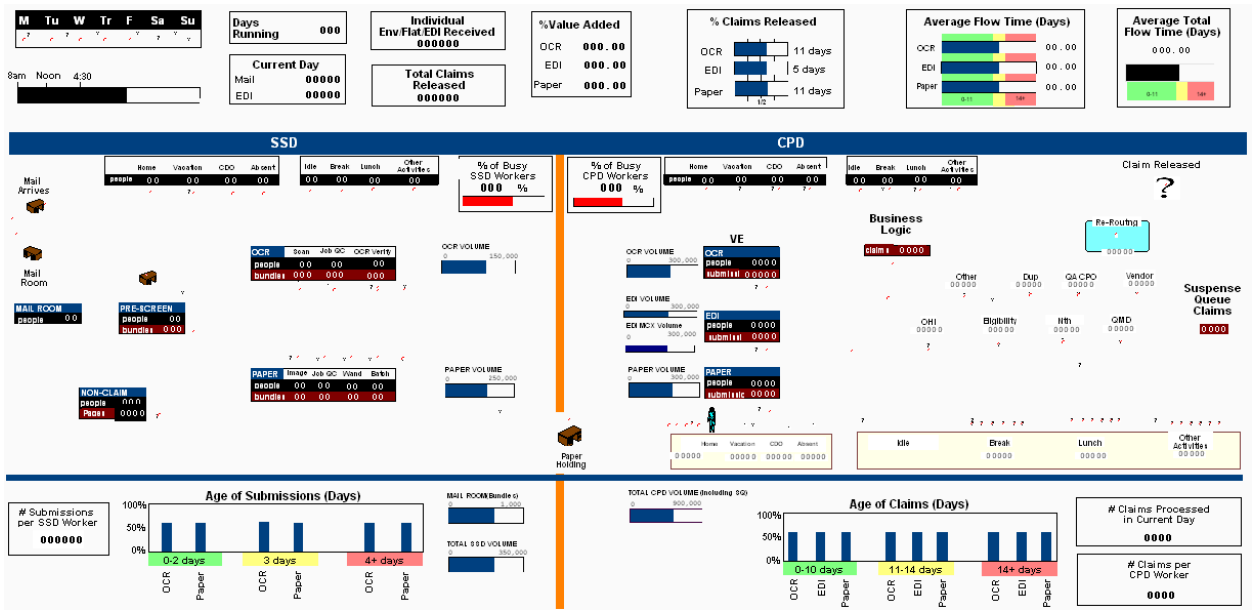
Project Impact: A beta site test begin in Q1FY12 at a VISN 8 Medical Center Fee Unit to evaluate the impact of the optimized processes on the accuracy of processing claims and to evaluate how well a Fee Unit can implement the processes utilizing various implementation tools developed by VA-CASE. National deployment of the FBCS optimized processes is anticipated to begin in approximately the third quarter of FY12.

HAC Simulation and Modeling Project:

Project Objectives: In partnership with the Health Administration Center (HAC) and Purdue University North Central faculty, Dr. Tom Brady, VA-CASE created a process simulation model of the HAC's claims process. The objectives of the development of the model were to answer several process management questions including impact to overall claims processing time for: a) staffing changes; b) changes in the mix of paper and electronic claims; c) performance metrics; d) demand changes; and e) discrete process step improvements.

Project Results/Impact: The simulation model was validated in late FY11. In conjunction with the model, VA-CASE evaluated the HAC's Support Services Department (SSD) and presented a report of findings and process improvement recommendations. The model will be used to test these process changes in a virtual environment to ensure change management success prior to implementing the changes on the SSD production floor. Similarly, the HAC intends to use the model to test various change scenarios with their Claims Processing Department.

HAC Claims Processing Model Animation Screen



Make/Buy Procedures Models:

Project Objectives: VA-CASE faculty and staff have developed a computer-based cost model that will allow service-specific and area-specific decisions regarding the internal vs external cost comparison for Specialty Care services. The goal is to develop computer-based decision models that can be used by VA administrators to aid decision making and by VA physicians and facilities as care needs are identified.

Each model is developed in two high level milestones: 1) Identification of primary decision model characteristics, including content and critical criteria for make/buy analysis and incorporation of this information into an Excel-based model and 2) Web-Based Decision Model Development, Implementation and Evaluation as a management decision-support tool.

Project Results/Impact: Dialysis Make/Buy Model was developed in partnership with VISN6. This model supported the building of four stand-alone dialysis units at four sites (VISN6/VISN10). The savings across these sites is estimated to be ~$8M as compared to contract rates. GI Clinical Procedures and Polysomnography Models are currently in development for national roll-out in Q2FY12.

Additionally, VA-CASE has partnered with the Stroke QUERI to develop an Acute Stroke/tPA Administration make/buy model. This model will integrate Emergency Department, ICU and acute inpatient clinical pathways to identify costs associated with facility designation as a National Stroke Center. The expected roll-out of this model will be in Q3FY12.

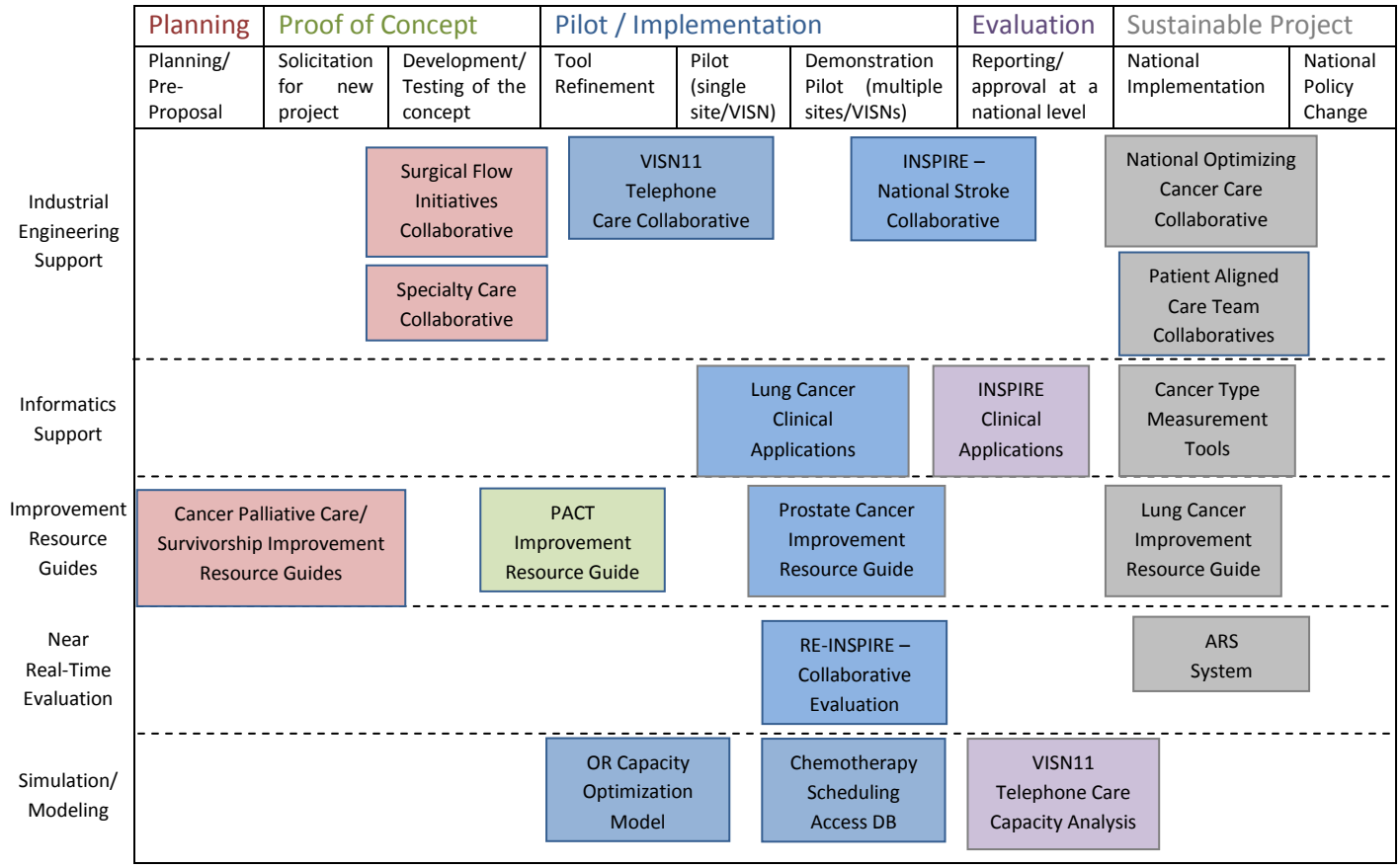
Dialysis Make/Buy Model User Interface and Output Example

B. Collaborative Program

The Veteran's Administration Center for Applied Systems Engineering (VA-CASE) Collaborative Program currently represents a partnership with the National Optimizing Cancer Care Committee, the VISN11 Telephone Care Collaborative Steering Committee, the National PACT Collaborative Steering, VHA Stroke QUERI (INSPIRE), the National Office of Specialty Care, and the National Surgery Office (NSO). The FY09-FY11 VA-CASE Collaborative Program budget was approximately $0.8M per year, with approximately $300K/year allocated from VA-CASE core funds.

The VA-CASE Collaborative Program works to partner VERC Industrial Engineering and collaborative coordinator resources with VISN and national collaboratives. This program integrates applied systems redesign (SRD) / operational systems engineering (OSE) principles into the national SR collaborative structure and is separated into five distinct support areas: 1) Industrial/Systems Engineering support; 2) Informatics and Clinical Application support; 3) Development and dissemination of Improvement Resource Guides; 4) Real-time and rapid-cycle evaluation tools and approaches; and 5) Application of advanced OSE techniques, such as simulation and modeling to inform further system optimization.

VA- CASE Collaborative Project Pipeline



VA-CASE Collaborative Programs Project Summary

National Optimizing Cancer Care Collaborative

Beginning in FY09, VA-CASE partnered with the National VHA Optimizing Cancer Care (OCC) National Systems Redesign Committee, as well as the VAPHS VERC and NEHCP VERC, to apply OSE and SRD methods to support and enhance work done by the current collaborative and provide capacity and capability for diffusion and implementation of collaborative strong practices related to the development and implementation of systematic processes for cancer care. To date there have been three Collaborative Phases – Phase 1: January 2009-January 2010, Phase 2: January 2010 - January 2011 and Phase III: June 2011-February 2012.

The VA Cancer Care Collaborative is focused on optimizing the timeliness and quality of cancer care throughout the VA health care system. The Cancer Care Collaborative has provided the mechanism to measure, analyze and implement changes to assure timely diagnosis and the timely initiation of evidence-based treatment. Nineteen teams across four Cancer Types (Lung, Breast, CRC and Prostate) participated in the in Phase I collaborative, 21 teams across five Cancer Types (Lung, Prostate, HCC, Head and Neck, CRC) participated in the Phase II collaborative and 22 teams across 2 Cancer Types (Lung and Head and Neck) participated in the Phase III collaborative.

Project Objectives:

The objectives of this project included:

- Provide Industrial and Systems Engineering training/coaching in OSE/SR methods to collaborative teams to facilitate implementation of next generation Cancer Care Processes.
- Create and implement informatics tools to enable standardized reporting methods associated with assessment and evaluation of timeliness and reliability of Cancer Care Treatment processes.
- Synthesize current strong practice recommendations for next generation Cancer Care Processes and Programs within Improvement Resource Guides.
- Partner with the existing national VHA Optimizing Cancer Care (OCC) and National Systems Redesign Committees to develop and test initiatives for real-time and rapid-cycle evaluation of collaborative teams.
- Develop/utilize advanced OSE tools and methods to facilitate implementation and diffusion of next generation Cancer Care Processes, i.e. capacity/staffing models, scheduling models, usability testing of electronic medical record user interfaces, etc.

Project Results/Impact:

Lung Cancer/INSPIRE Clinical Applications : see VA-CASE Informatics Program Information

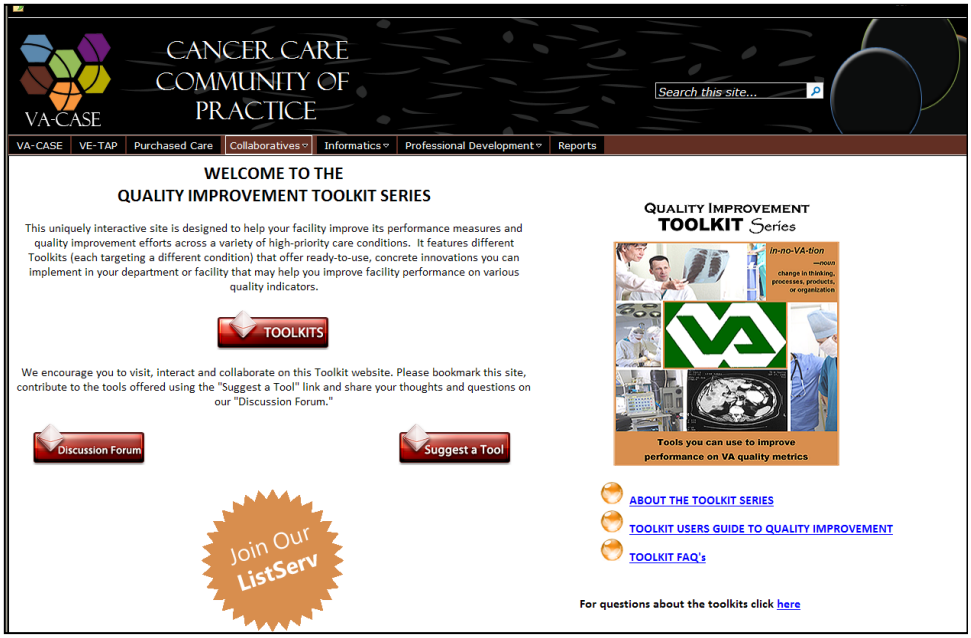
Industrial Engineering Support: VERC Industrial Engineers have provided over 1200 days of on-site IE support across the 60 Phase I/II/III teams. The engineers have introduced a variety of improvement

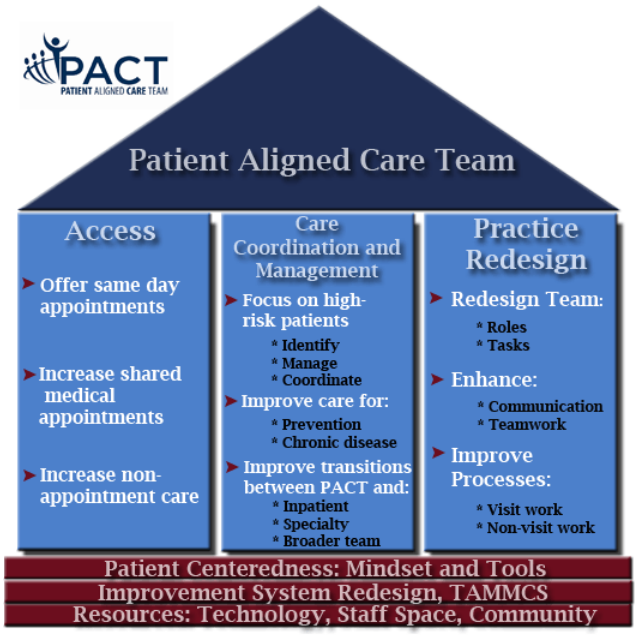
approaches to the collaborative teams such as the VA-TAMMCS model, lean, six sigma, performance improvement, ACA, and rapid process improvement. Additionally, the VERC IEs were integral to the development of standardized measurement and tracking tools for each type of cancer, introducing advanced system redesign methods for specific aims, and performing appropriate data analysis.

Cancer Type Measurement Tools: For the phase III Cancer Care Collaborative, VERC IEs facilitated development of standardized measurement and tracking tools for each cancer type. The tool identifies key timeliness and quality measures as a function of entered patient data. Each type of cancer tool contains "Data Entry Sheet", "Measurement Sheet", and "Chart Sheet". The users enter data in the "Data Entry Sheet" and measurements and charts are automatically generated. Charts are utilized during the collaborative learning sessions to identify process constraints and 'bottle necks' as well as quality of care issues.

Improvement Resource Guides: Web-based Cancer Type and PACT Improvement Resource Guides were developed as part of the VERC/HIV AIDs QUERI "Quality Improvement Toolkit Series". This Project has a single goal: to produce and disseminate national quality improvement resource Toolkits that will help VA facilities improve performance on OQP quality indicators and performance measures. These Toolkits are based on the VA-TAMMCS (Team—Aim—Map—Measure—Change—Sustain) model, the framework of systems redesign and continuous improvement tailored to the structure and needs of the VA system.

The Toolkits are meant to be used and evaluated by VA's clinical managers and policy makers to improve diagnosis, treatment, and patient outcomes for high-priority conditions. Each Toolkit will serve as a resource for improving facility performance on a specific set of established performance measures and/or quality indicators.





WELCOME TO THE PACT TOOLKIT

Part of the VA Quality Improvement Toolkit Series

Welcome! This interactive site is designed to help you implement the Patient Aligned Care Team (PACT) initiative at your facility more easily and more effectively. The PACT Toolkit is a centralized library offering you access to a range of innovations, or "tools," in care delivery and organization that have been developed by your VA colleagues nationwide. You can also upload your own innovations to share with others.

To help you identify the innovations you may want to adopt, we've matched each innovation to one or more of the three main PACT Pillars: Access, Care Coordination and Management, and Practice Redesign.

Share your own innovations!

The PACT Toolkit is the newest addition to the VA PACT Communities of Practice. Have you created a tool that other VA staff might find useful? Click on the "Submit a Tool" link to upload it to this site! You can also check out the Discussion Forum to share your thoughts and questions.

To get started finding tools, just click on one of the Pillars!

Real-Time and Rapid-Cycle Evaluation Methods:

- **Audience Response System (ARS):** In FY10 – VA-CASE faculty, led by Dr. Ed Miech and Dr. Debi Griffith, worked to pioneer the use of an Audience Response System (ARS) in the VA to evaluate the impact of VA-sponsored events. These events include Learning Sessions at the regional and national levels (including the national VA Cancer Care Collaboratives and the national VA Telephone Access Collaborative), PACT Regional Learning Sessions, Systems Redesign educational training sessions at the practitioner (Yellow Belt) and facilitator levels (Green Belt), and VHA Senior Executive (SEE) and Leading Organizational Improvement Workshops (LOIs).

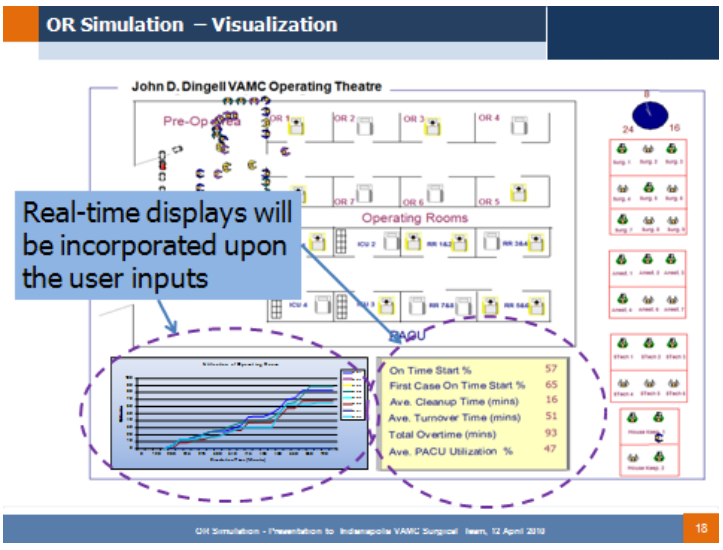
  The ARS offers a new way to conduct innovative, rigorous and evidence-based evaluation within the VA by permitting VA event organizers to collect information from participants at baseline and endpoint, capturing both pre- and post- data for each participant. The immediate display of results to each question keeps participants engaged during the ARS sessions because they can see how all other participants just answered the identical question, as well as where their response falls within the overall distribution. Since introduction of the ARS, over 5500 'clickers' have been acquired across 40 VHA facilities.

- **Team Development Measure (TDM):** Over the last year VA-CASE faculty played a key role in securing permission for the VA to use the 31-item Team Development Measure (TDM) throughout the national organization free of charge. The TDM assesses interpersonal effectiveness in the

context of teams. The TDM is a validated measure that allows teams in healthcare settings to assess their current "internal dynamics," including cohesion, communication, role definition, and team goals. The TDM has already been used with dozens of VA teams this year and is now available to any VA staff member. VA-CASE faculty have been instrumental in piloting and introducing the TDM to the VA and implementing its use at the level of a Collaborative. VA-CASE faculty and staff coordinated the administration of the TDM to participants in the national VA Cancer Care Collaborative (CCC) and produced the customized reports for the 18 CCC teams. VA-CASE faculty also met face-to-face with CCC coaches to discuss different strategies for debriefing teams on their TDM report.

- **Context Matrix:** As part of the Cancer Care Collaborative (CCC) Phase II evaluation, VA-CASE faculty, led by Dr. Ed Miech, piloted a new method for evaluating VA multi-site initiatives called the "context matrix" approach. This approach involves prospectively developing and maintaining a context matrix that encompasses all of the 21 VA sites over the course of the collaborative. Within this pilot, documents posted on the CCC II SharePoint site and shared as attachments via the CCC II planning committee email distribution list were integrated into a single NVivo8 project file on an ongoing basis. While the files imported into the CCC II context matrix database were documents in Word and PDF format, NVivo8 also has the capacity to import images, audio files, and video. This new method for capturing, organizing, and analyzing large amounts of unstructured data – both quantitative and qualitative – will be subsequently refined and disseminated on a large scale as part of an HSR&D study called "RE-INSPIRE," a 3-year Service-Directed Project (SDP) with a total budget of $946K.

Advanced OSE Tools: Wayne State Faculty, led by Dr. Alper Murat and in partnership with the Detroit VAMC technical advisor, Susan Yu, have developed an operational simulation model for proactive management of OR resources (POM-ORS). This model can be utilized to provide tactical management of OR scheduling to optimize utilization. This model is currently in pilot in the Detroit VAMC with planned roll-out within other VISN11 sites.



Overall Project Impact:

Summary of Improvement Achieved by Team in Cancer Care Collaborative, Phase

	Data				
Cancer Type	# of Facilities	Total # of AIMs	% of AIMs Met	Average % improvement over baseline	% of AIMs showing improvement >40% of baseline
Breast	3	9	89%	55%	67%
CRC	3	9	89%	51%	56%
Lung	9	39	72%	98%	71%
Prostate	3*	7	86%	26%	29%
Grand Total	18	64	78%	76%	63%

Summary of Improvement Achieved by Team in Cancer Care Collaborative, Phase II

Cancer Type	#of Facilities	Total # of AIMs	% of Aims Met	Average % improvement over baseline	% of aims showing improvement > 40% of baseline
CRC	3	8	50.00%	63.68%	100%
HCC	3	13	84.62%	64.28%	75%
Head & Neck	5	25	72.00%	56.86%	67%
Lung	8	39	74.36%	50.34%	73%
Prostate	2	9	62.50%	55.41%	88%
Grand Total	**21**	**94**	**72%**	**56%**	**76%**

VISN11 Telephone Care Collaborative

In Sept. 2009, VA-CASE partnered with the VISN11 Telephone Collaborative Planning Committee to provide OSE support in application of OSE/SRD methods to support and enhance work done by the current Collaboratives. VA-CASE also provided capacity and capability for diffusion and implementation of collaborative strong practices related to the development and implementation of systematic processes for redesign and optimization of VISN11 Healthcare Facility Telephone Systems.

Project Objectives:

- Provide training/coaching in OSE/SR methods to local and regional spread and dissemination initiatives for next generation telephone processes and systems.

- Develop/utilize advanced OSE tools and methods to facilitate implementation and diffusion of next generation telephone processes and systems, i.e. capacity/staffing models, scheduling models, usability testing of electronic medical record user interfaces, etc.

VISN11 Pharmacy Call Center Model:

Wayne State VERC faculty members, led by Dr. Ratna Chinnam, Dr. Kai Yang and Dr. Darin Ellis developed a VISN11 Call Center Model to evaluate/compare VISN and national centralized vs. decentralized facility call center operational costs.

Project Objectives: Pharmacy Call Center data from across VISN11, specifically call volumes and call handling times in recent periods specified by VISN11 staff, were analyzed using a mathematical model to determine minimum estimated staffing requirements to meet new VA service level goals of ≤5% call abandonment rate (AR) and ≤30 seconds average speed of answer (ASA) under different operational scenarios. Scenarios analyzed include: 1) adjusting current sites staffing levels to meet the new goals; 2) consolidation into a single centralized site for all of VISN11; and 3) consolidation into two regional sites (split among North and South sites).

Project Results/Impact: Modeling results indicate that in terms of agent staffing levels, the current state (i.e., continuation of pharmacy call centers at each of the seven VISN11 sites) would require an average of 30.66 agents totaled across sites to meet service level goals (an increase from $2.09/call to $3.08/call in agent salary costs alone). Efficiency improvements for consolidated call center options were predicted. Including some basic estimates of supervisory and pharmacist staff costs, the overall salary $/incoming call for a fully centralized option and a north/south regionally centralized option show substantial savings relative to increasing staffing levels at each site. The costs predicted for fully and regionally centralized options were $2.53 and $2.87 per call, respectively.

Presentation of these results resulted in the design of a 'hybrid' VISN11 and national call center model. This model is currently in pilot within VISN11.

Patient Aligned Care Team Collaborative:

In 2010 the VHA embarked upon an 18-month nationwide PACT Collaborative to align patient-centered care to a more veteran-centric model. The national PACT Collaborative is divided into five regions: Mid-South, Central, West, Southeast, and Northeast. Each region designed, developed and delivered six learning sessions and five action periods.

VA-CASE was charged with providing support services including administrative, coordination, coaching and technical support for each of the five regions. Support is provided through a national Co-Coordinator, a national Co-Director, Industrial Engineers and an Education Coordinator. VA-CASE has worked together with the New England VERC, Pittsburgh VERC and Midwest Mountain VERC to identify and allocate one Industrial Engineer and one Coordinator per region for the 18-month Collaborative.

Project Objectives:

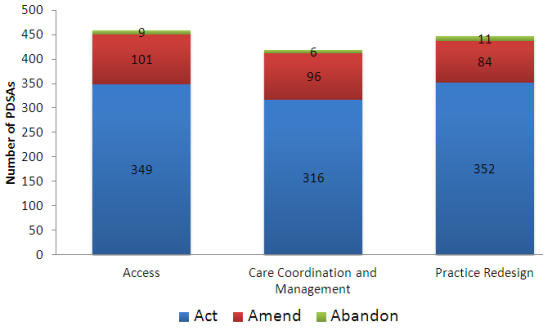
The objectives of this project include:

- Provide administrative and coordination support to the National PACT Steering Committee and Regional PACT Steering Committees.
- Provide training/coaching in highly effective collaborative methods to National PACT Steering Committee and Regional PACT Steering Committees.
- Partner with National PACT Steering Committee and Regional PACT Steering Committees in development, implementation, diffusion and maintenance of PACT measurement and informatics tools throughout national collaborative teams.
- Partner with National PACT Steering Committee and Regional PACT Steering Committees in development, implementation, maintenance and diffusion of PACT "Change Package" throughout national collaborative teams.
- Development, testing and implementation of evaluation methods and tools to enable real-time and rapid-cycle assessment and feedback of regional collaborative effectiveness at the individual, team and collaborative levels.

Project Results/Impact:

- Trends increased for each pillar over each action period (AP) across the six learning sessions (LS)
- 1324 PDSAs Attempted, 1298 were Successful (ACT + Amend)
- Nationally 80% used the following three ACCESS principles:
  - Reduce Demand (47%)
  - Balance Supply & Demand for Appts (21%)
  - Increase Supply (10%)
- Nationally 70% used the following two CARE MANAGEMENT principles:
  - Improve transitions (41%)
  - Focus on high risk patients (31%)
- Nationally 80% used the following four PRACTICE REDESIGN principles:
  - Predict and Anticipate Patient Needs (41%)
  - Synchronize (17%)
  - Optimize the Environment (13%)
  - Manage the Constraint (12%)

Trend of Coaches Assessment Score by Pillar across LS



1324 PDSAs Attempted

VA-CASE

Industrial Engineering Support: During the collaborative the VERC Industrial Engineers (IEs) work with the regional planning committees and site coaches as a resource for questions and guidance related to the VA-TAMMCS model and other improvement approaches. In addition, IEs act as Learning Session Faculty, presenting breakout and plenary sessions, and participating on monthly calls. The VERC IEs also provide expertise in designing spreadsheets to support the measurement and to assist with knowledge mining and management to inform the collaborative and further refine the PACT Change Package.

Real-Time and Rapid-Cycle Evaluation Methods: The Education Coordinator has developed and used the Audience Response System (ARS) at learning sessions to provide real-time feedback for the regional planners. Furthermore, work was performed on developing standard ARS questions to be used across regions.

PACT Measurement Tools: VERC Industrial Engineers developed easy to use team measurement tools—one for each pillar-- which were tested and rolled out as the standardized national measurement tool for the PACT Collaborative.

	PROVIDER: Smith			% Increase in care Provided Outside Single Provider Appointment Venues							
	Week Beginning Date (m/dd/yyyy)	Total Clinic Work Minutes (This includes traditional and outside venue appointments. Scheduled admin and ward time should not be included)	Traditional Visit (Actual total minutes during week)	Telephone Visit (Actual total minutes during week)	Group Visit Time (Actual total minutes during week) per Appt Slot)	E-Mail / Secure Messaging Time (Actual total minutes during week)	Tele-Health (Actual total minutes during week)	GOAL - Outside Single Provider Appointment Venues	% of Care Outside of Single Provider Appointment Venues	Total Minutes of Care Outside of Single Provider Appointment Venues	% of Care of Traditional Single Provider Appointment Venues	% of Time Not Including Outside Appointment or Traditional Venues (Admin Time, etc...)
	Example	1200	800	60	90	150	30	30%	28%	330	67%	6%
4th Quarter FY 2010	6/28/2010	1200	800	92	76	44	99	30%	26%	311	67%	7%
	7/5/2010	1200	750	98	65	56	76	30%	25%	295	63%	13%
	7/12/2010	1200	825	87	98	87	77	30%	29%	349	69%	2%
	7/19/2010	1200	670	77	66	88	77	30%	26%	308	56%	19%
	7/26/2010							30%	#N/A	0	#N/A	#N/A
	8/2/2010							30%	#N/A	0	#N/A	#N/A
	8/9/2010							30%	#N/A	0	#N/A	#N/A
	8/16/2010							30%	#N/A	0	#N/A	#N/A
	8/23/2010							30%	#N/A	0	#N/A	#N/A
	8/30/2010							30%	#N/A	0	#N/A	#N/A
	9/6/2010							30%	#N/A	0	#N/A	#N/A
	9/13/2010							30%	#N/A	0	#N/A	#N/A
	9/20/2010							30%	#N/A	0	#N/A	#N/A
	9/27/2010							30%	#N/A	0	#N/A	#N/A

Example Output from PACT Access Pillar Measurement Tool

INSPIRE Stroke Collaborative

In partnership with the VHA Stroke QUERI, funding for the Intervention for Stroke Performance Improvement using Redesign Engineering (INSPIRE SDP 09-158) was received in Jan. 2010. This study is a randomized-controlled trial including 12 VAMCs with at least 50 ischemic stroke admissions in FY07 and demonstrated room for improvement on two stroke indicators from the OQP dataset (dysphagia screening before oral intake and DVT prophylaxis).

Project Objectives: The aims of this project are to: 1) assess the impact of disseminating the OQP Stroke Special Project data on facility stroke improvement activities, and 2) test a SR based intervention vs. quality indicator feedback alone for improving two in-hospital indicators.

The INSPIRE study aims to identify the relative effect of a formal SR-based collaborative on performance improvement and to identify site characteristics associated with improvement in care in both the intervention and control sites. This study is complemented and will be extended by the "RE-INSPIRE" SDP, which involves a more in-depth contextual evaluation of the same 12 sites, including additional site visits, measurements of team dynamics over time, and assessment of sustainability of performance and use of change methods after the original study ends. The "RE-INSPIRE" began in April 2011 and will initiate site visits spring 2012.

In April 2011, VA-CASE led a learning event to educate INSPIRE participants on the VA-TAMMCS improvement model. INSPIRE participants utilized this model to initiate working on their Aims to both improve their rates of dysphagia screening before oral intake and usage of DVT prophylaxis. In June 2011, site visits began for all intervention teams including Nashville, Birmingham, Houston, Miami and Loma Linda. In November 2011, the Los Angeles team became committed to the INSPIRE initiative and was provided an onsite Learning Session.

Project Results/Impact:

- A total of 37 PDSA cycles are being assessed at the 6 INSPIRE Stroke Initiative sites.
- All sites continue to work on PDSA's to improve their Stroke outcomes and are monitored monthly via telephone conferences. Intervention sites work to share their successful PDSA's with other intervention sites particularly CPRS admission template models as well as a popular dysphagia protocol video developed by the Houston team.
- Thus far, there has been an increase in the quality of stroke care at six of the largest volume VA facilities, which could lead to improved outcomes for veterans receiving care at the intervention sites. This intervention will also provide an opportunity to critically evaluate System Redesign strategies and impacts on performance improvement.
- As of January 2012, baseline semi-structured interviews were completed at all of the 12 sites and the qualitative data obtained is currently being analyzed. The 2009 baseline performance data was abstracted, and the data feedback was processed for 11 sites. 2011 and 2012 prospective performance data is currently being abstracted for 11 sites.

RE-INSPIRE Service Directed Project

The 3-year, $946K RE-INSPIRE Service Directed Project (SDP) study officially began on October 1, 2011. In addition to investigating how local context influences the ways in which VA staff improve acute stroke care for Veterans at 12 different VA sites, the RE-INSPIRE study will also be uniquely positioned to assess the impact of the new VHA Acute Ischemic Stroke Directive (2011-038), which was announced on November 2, 2011.

Project Objectives: A specific aim of the RE-INSPIRE study is to provide VA leaders and managers with an innovative new method to track progress in complex initiatives that roll out in multiple locations at multiple levels and on multiple timetables. Consistent with that aim, a two-person team from the RE-INSPIRE study started in January 2012 to conduct a prospective, formative, near-real time evaluation of the implementation of the Lean Management System at the Roudebush VA. This formative evaluation is part of the ongoing partnership between VA-CASE and HSR&D to collaborate on projects that create new value for Veterans and VA leadership, and is evidence-based, innovative, and practical. The two-person team is prospectively collecting multiple types of data from multiple sources related to the implementation of Lean Management System at the Roudebush VAMC and then integrating this data into a single cumulative project file using the powerful new application NVivo9. This unified project file is then explored, queried, and analyzed in interactive and flexible ways that support rapid-cycle reporting of findings and near-real time access to data.

This formative evaluation should provide Roudebush VA leadership with a continuous source of useful, actionable information about improvement related to Indy Excellence 2.0 across the facility. In providing a new set of evidence-based "windows" on how implementation is taking shape in near-real time at the Roudebush VAMC, this prospective evaluation can help leadership identify areas where corrections or adjustments may be indicated. The same evaluation can then help leadership track the impact of those mid-course corrections or adjustments. This formative assessment is being performed as part of the larger QI initiative, not as a formal research study.

The VA as an organization pursues innovation and transformation as part of its core mission to improve health care for Veterans. The goal of this novel approach to evaluation is to provide the VA in general with a new, validated, evidence-based method to convert data into actionable intelligence and systematically track improvement and progress within and across facilities involved in complex VA initiatives.

The study has been staffed with two project managers, who are now working with VA staff at the 12 participating VA medical centers around the country to secure the required local approvals before the first site visits can begin in Spring 2012.

Specialty Care Collaborative

The Specialty Care Collaborative will explore alternatives to the traditional models of healthcare delivery, which currently are often lacking in coordination among the various settings and providers, such as ECHO project, SCAN and E-Consults. This is a VHA-wide set of two Specialty Care Collaboratives – one with focus on Surgery specialties of Orthopedics and Urology, and one with focus on Medicine/General specialty clinic access.

Project Objectives: The Specialty Care Pilot Collaborative will seek to develop, learn and spread healthcare delivery systems that highlight the patient as the center, coordinate specialty care services needed for the patient with PACT (Care Coordination Agreements), and deliver these services in part via non-traditional means, such as telephonic, secure messaging, video and web-based technologies.

This project is in the planning stage and will be started in March 2012.

Surgical Flow Education Initiatives Collaborative

The Veterans Health Administration (VHA) Office of Systems Redesign (SR) in collaboration with the (VHA) National Surgery Office (NSO) will be conducting a national Surgical Flow Education initiative (SFEI) in FY2012, with several phases. This project involves expertise from VERC engineers with primary resource commitments allocated to the 3rd Phase, which is a series of local Rapid Process Improvement (RPIWs) workshops across 21 VHA facilities nationally.

Project Objectives: Improve VHA operating room flow, efficiency, and operations through improving front line operations/function at selected Medical Centers, designing and piloting an effective improvement strategy for Operating Room Operations and identifying and documenting specific strong practices that could/should be considered for all VHA Operating Room teams.

This project is in the planning stage and will be started in April - May 2012

MOVE!® Weight Management Program for Veterans (MOVE!®)

VA-CASE - in collaboration with James A. Haley VA Hospital - conducted a RPIW for the MOVE program to achieve MOVE! target goals and serve as a best practice model to show case optimizing utilization of health care services specifically related to addressing the obesity crisis among Veterans.

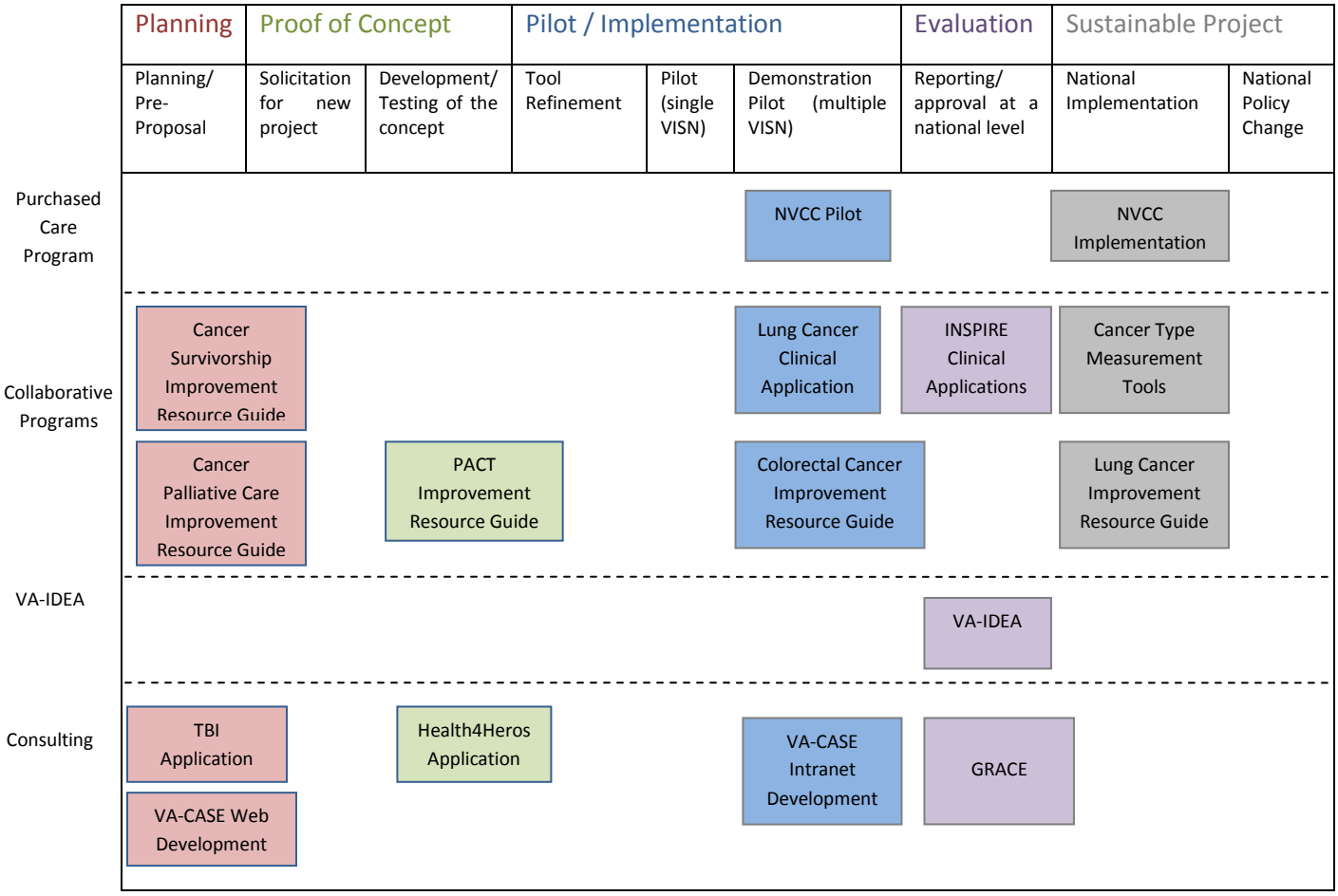
Project Objectives: Getting the correct people in the correct program in a timely manner, improving the scheduling process for veterans into the program and improve structure and content of MOVE! classes.

This project is in the implementation stage and will continue into 2012.

C. Informatics Program

The Informatics Program works across Veterans Administration Center for Applied Systems Engineering (VA-CASE) programs, as well as VISN and national VHA program offices, to design, develop, test, and implement standardized tools for use across the enterprise. This program works to integrate Human Factors Engineering principles and usability testing at the onset and continuously during the project, as well as to insure that experienced Clinical Application Coordinators (CAC) are integrated throughout to ensure the development of clinical tools that are consistent with the project goals and deliverables. The program is broken into four areas of support: 1) Purchased Care 2) Collaborative 3) VA-Informatics Development and Education Academy (VA-IDEA) 4) Consulting/Web Development. The FY11 VA-CASE Informatics Program budget was approximately $1.0M, with approximately $100K allocated from VA-CASE core funds.

VA- CASE Informatics Project Pipeline



VA-CASE Informatics Program Project Summary

Web Development: The Informatics Program has developed a VA-CASE intranet site for collaboration with project teams and the VA as a whole. The site is hosted on VISN11 servers and includes six focus areas: 1) VA-CASE, 2) Collaborative, 3) Informatics, 4) Professional Development, 5) Purchased Care, and 6) VE-TAP.

The site can be accessed from within the VA at:
https://vaww.visn11.portal.va.gov/sites/Indianapolis/verc/default.aspx

Project Objectives: To promote the projects and activities of VA-CASE in a central location. The intranet site provides a repository of Process Improvement Resource Guides (toolkit) and that of future initiatives. In collaboration with the Office of Quality and Performance (OQP); Office of Systems Redesign (SRD); Quality Enhancement Research Initiative (QUERI); and the Center for Implementation Practice and Research Support (CIPRS), VA-CASE supports the design, creation, usability testing, and publishing of an intranet site for the Quality Improvement Toolkit Series.

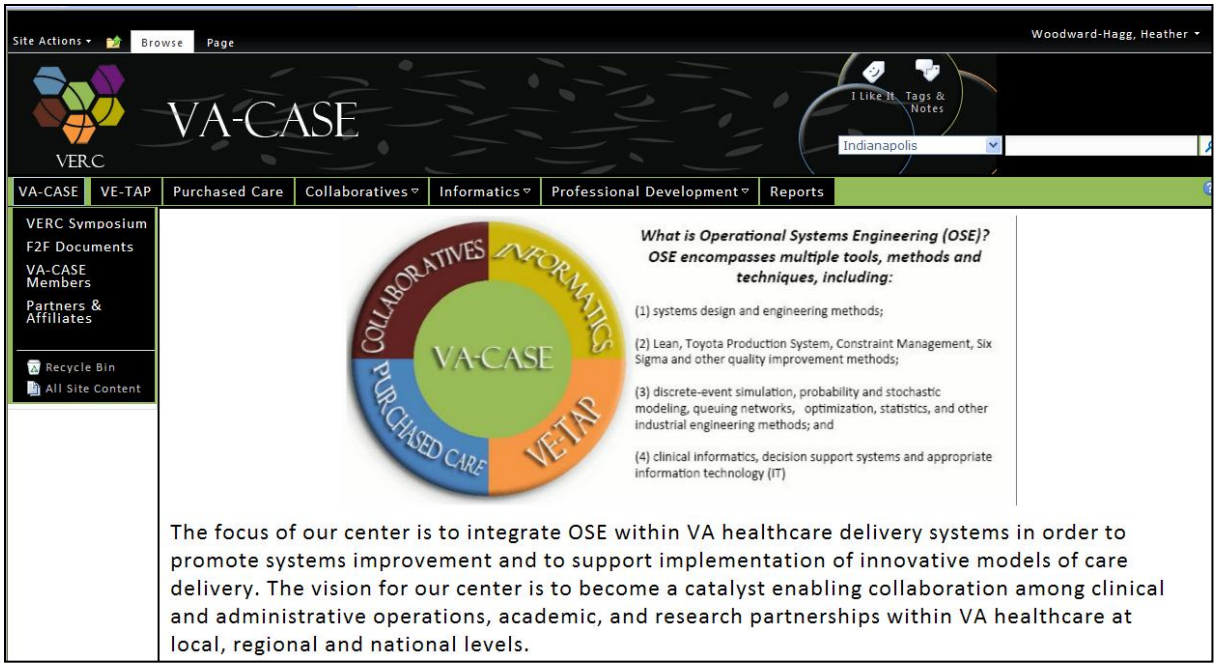
Project Results/Impact: The VA-CASE staff has provided guidance to other facility and VERC staff in development of similar toolkit pages to promote best practice and quality in clinical practice. In partnership with the HIV/AIDS QUERI, VA-CASE staff developed the framework for development and formatting for electronic resource guides (toolkits). VA-CASE is partnering with national Systems Redesign (SRD) and HIV/AIDS QUERI to design, collect tools and use standardized page formatting on the SRD webpage for PACT electronic toolkit.

- **Cancer Care Improvement Resource Guide (toolkit)** - Lung and Colorectal fully implemented with 1,900 new visitors since FY10. Head & Neck, Survivorship, Palliative Care tools are being collected, vetted and prepared for addition to the electronic toolkit.

- **Patient Aligned Care Team (PACT) Improvement Resource Guide (toolkit)** - 462 total new users since implementation of sample tools for learning session 6 on September 4, 2011. New tools are being consistently being collected for vetting, write up, and added to the site.

- **VA-CASE document library** currently in use by Non-VA Care Coordination (NVCC) national implementation team for CPRS templates, note titles, consults, and instructional guides. The site is accessed by each VA site planning to implement NVCC.

- **Stroke QUERI intranet site** is being used to facilitate the quality initiative of prevention of stroke in Veterans. Housed within are the interventional team minutes, calendar, and documents of the improvement process.


Site Actions
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Page
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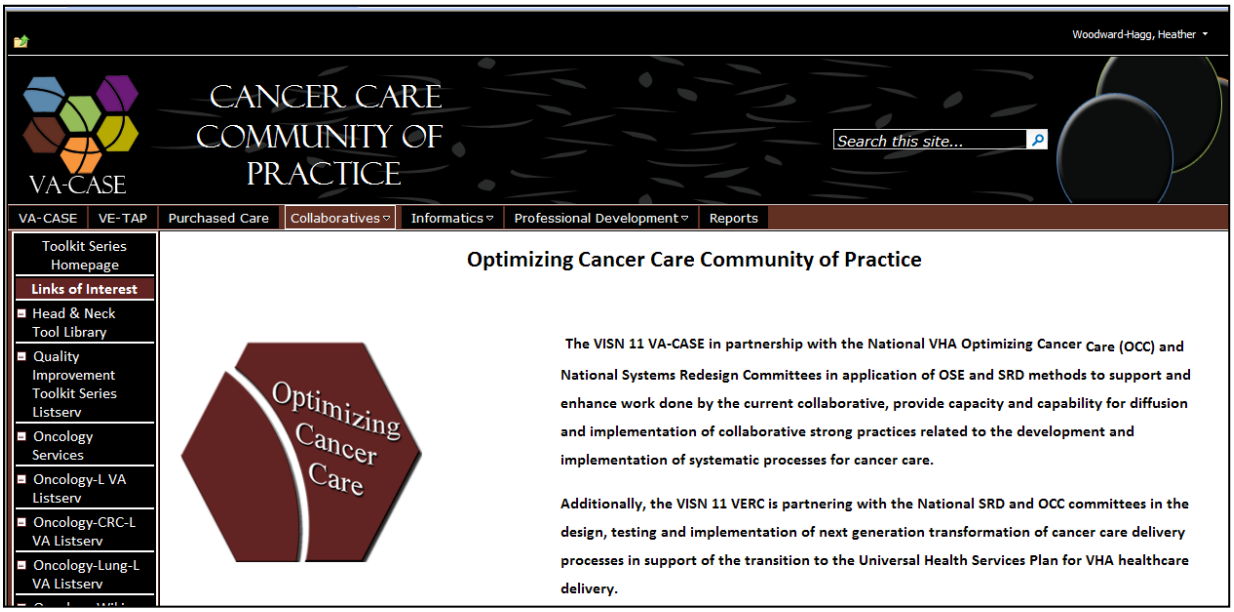
VERC
VA-CASE
I Like It
Tags & Notes
Indianapolis
VA-CASE
VE-TAP
Purchased Care
Collaboratives
Informatics
Professional Development
Reports
VERC Symposium
F2F Documents
VA-CASE Members
Partners & Affiliates
Recycle Bin
All Site Content
COLLABORATIVES
INFORMATICS
VA-CASE
PURCHASED CARE
VE-TAP
What is Operational Systems Engineering (OSE)?
OSE encompasses multiple tools, methods and techniques, including:
(1) systems design and engineering methods;
(2) Lean, Toyota Production System, Constraint Management, Six Sigma and other quality improvement methods;
(3) discrete-event simulation, probability and stochastic modeling, queuing networks, optimization, statistics, and other industrial engineering methods; and
(4) clinical informatics, decision support systems and appropriate information technology (IT)
The focus of our center is to integrate OSE within VA healthcare delivery systems in order to promote systems improvement and to support implementation of innovative models of care delivery. The vision for our center is to become a catalyst enabling collaboration among clinical and administrative operations, academic, and research partnerships within VA healthcare at local, regional and national levels.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CANCER CARE COMMUNITY OF PRACTICE
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Informatics
Professional Development
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Toolkit Series Homepage
Links of Interest
Head & Neck Tool Library
Quality Improvement Toolkit Series Listserv
Oncology Services
Oncology-L VA Listserv
Oncology-CRC-L VA Listserv
Oncology-Lung-L VA Listserv
Optimizing Cancer Care Community of Practice
Optimizing Cancer Care
The VISN 11 VA-CASE in partnership with the National VHA Optimizing Cancer Care (OCC) and National Systems Redesign Committees in application of OSE and SRD methods to support and enhance work done by the current collaborative, provide capacity and capability for diffusion and implementation of collaborative strong practices related to the development and implementation of systematic processes for cancer care.
Additionally, the VISN 11 VERC is partnering with the National SRD and OCC committees in the design, testing and implementation of next generation transformation of cancer care delivery processes in support of the transition to the Universal Health Services Plan for VHA healthcare delivery.

INSPIRE Clinical Applications:

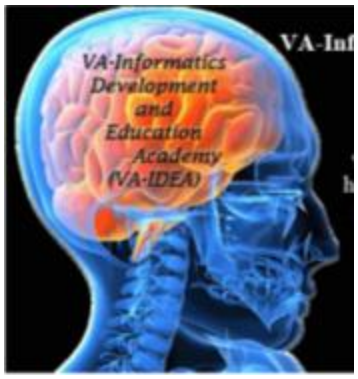
Partnership with the VA Stroke QUERI has also resulted in a unique opportunity to leverage funding for joint VA Clinical Applications Coordinators (CACs). This is a crucial and tangible link between research and operations, as the CACs are charged with implementing national and local reminders and other changes to CPRS that are designed to improve the processes, documentation, and outcomes of VA care.

Project Objectives: This partnership has been fruitful in multiple ways: 1) timely development and implementation of CPRS-based improvement interventions on QUERI projects; 2) development and sharing across sites of VistA-based algorithms and CPRS templates to track stroke processes of care; 3) development of Indianapolis-based training on reminder development to support quality assessment for CACs in multiple other VISNS; and 4) development of CAC training manuals that increase the ability of CACs across the VA to construct CPRS reminders and templates in ways that facilitate data collection for clinical improvement evaluation.

Project Results/Impact: One project that exemplifies this shared benefit is our Administrative Surrogates RRP. In this project, we constructed VistA-based quality indicators for three in-patient stroke quality indicators, including an indicator for providing DVT prophylaxis for non-ambulatory stroke patients.

Work on this research project by Mr. Jeff Fahner, CAC in Indianapolis, led him to modify the algorithm for a VISN-wide non-stroke focused clinical project to improve documentation of mechanical DVT prophylaxis for monthly IPEC reporting. This new report is currently being deployed through PDSA cycles through national DVT reporting use, leading to a new understanding of how reminder reports could be modified to address other clinical problems, and has subsequently led to wider benefit in VA through ongoing CAC training.

VA-Informatics Development Education Academy (VA-IDEA)



VHA relies on the accuracy, stability, and performance of CPRS and VistA to provide care for our patients. Clinical Application Coordinators (CACs) and similar health care informaticists are charged with teaching, developing, revising, managing, and supporting VHA's electronic medical record; however, very few receive adequate structured, comprehensive training on the CPRS tools and VistA packages they support. Traditionally, CACs receive informal, ad-hoc, and on-demand training to learn their roles, responsibilities, duties, and skills. Relying solely on incidental learning risks has embedding incorrect ideas, flawed concepts, and allowed a slow leak of organizational knowledge through experience attrition when veteran CACs retire or leave the position.

Clinical Application Coordinators, Jeff Fahner and Russell Jacobitz, have developed the VA-Informatics Development and Education Academy (VA-IDEA) to provide comprehensive education to VHA's health care informaticists ensuring each learns and maintains a core set of competencies to support, develop, and instruct CPRS\VistA and adjunct applications.

Project Objectives:

VA-IDEA develops and implements a national-focused, multi-faceted, comprehensive health care informatics training curriculum, mentoring program and evaluation methodology. The curriculum is based in constructivism, a utilitarian cognitive learning theory that encourages active learning and relevant student exercises as the best method for knowledge construction for adult learners.

Core skills for each of the fundamental CPRS\VistA packages and applications are instructed through a variety of methods to ensure that the objectives and outcomes are applicable to the broad role-range of VHA health informaticists. The primary delivery method is a 3-5 day application immersion courses via remote and on-site face-to-face instruction based at the Richard L. Roudebush VAMC. Each course includes lecture, demonstration, extensive hands-on student exercises and post course follow-up mentoring.

Project Results/Impact (to date):

- Clinical Reminder I has been taught at four unique facilities and one virtual course. Clinical Reminder II advanced immersion course has been taught at two unique sites. A total of 101 facilities have been represented at the training sessions with 298 students participating across courses. The results of a national needs assessment indicated a need for CAC 101. The CAC 101 course was developed and the initial training session conducted in December 2011 in Orlando, FL.

- VA-IDEA was awarded a VHA Innovations Grant in FY11 with funds allocated to program expansion and to establish two regional training centers for the course at Indianapolis and Tucson.

- The program has resulted in three national clinical reminders being implemented and training completed including Mammogram adoption by CBO. Three hundred informaticists were trained virtually in clinical order checks.

- The courses have generated widespread interest within the national CAC community and plans are being made to expand, including recognized certification and continuing education in FY12. Plans are ongoing for the two regional training centers opening and expansion of virtual training in FY12.

- The Lung Cancer Care Collaborative reminder was created and is in testing at 10 sites nationally with the goal of developing more efficient mechanisms to capture quality and performance measures and other data relevant to monitoring cancer care. The reminder creates structured data that can be used to assess several quality indicators for lung cancer without the subsequent need for manual data abstraction from the electronic health record.

Human-Computer Interaction (HCI) & Simulation Lab: The VA Center of Excellence on Implementing Evidence-Based Practice, in collaboration with the Indianapolis VAMC and the VA-CASE, has developed a human-computer interaction (HCI) laboratory to investigate the usability of computerized clinical decision support and other informatics tools toward transforming the VA's information system.

Lead by Dr. Jason Saleem and Dr. Alissa Russ, this lab provides an environment to capture usability data, assess user interaction with information systems, and also provide a centralized location for assessing optimal display and integration of clinical and operational data to integrate into clinical and management decision making. This laboratory is equipped to conduct simulation studies and support research and operations efforts by providing the following capabilities: collection of video scenarios of HCI activities; recording of user screen actions through instrumented software designed to capture user

interaction with the software interface; and rapid prototyping of new software designs or changes to existing clinical programs such as VA's CPRS and My HeatheVet.

Through the HCI & Simulation Laboratory, we are able to develop and modify software to improve HCI and usability, furthering the integration of IT into clinical workflow and increasing its acceptance through improved software design. This laboratory also allows evaluation and assessment of these changes to demonstrate and measure the effectiveness of software modifications.

Project Results/Impact (to date): Use of human factors and HCI lab lead to the VACO Transplant template conversion to a reminder dialog and NVCC Mammography Radiology process being adopted by CBO. The Lung Cancer Care Collaborative reminder dialog is currently in testing at 10 sites nationally.

iPhone Application Development: VA-CASE is focused on innovative application development using Agile development and incorporating human factors engineering principles. The Agile methodology is based on rapid cycle, iterative and incremental development processes. Agile software development principles are compared to Lean thinking by delivering the right thing to the people who want it, in a timely fashion and in usable form. By incorporating human factors into the development, the quality of the development is improved. The Office of Patient Centered Care/Cultural Transformation funded a grant for iPhone application development of Veteran Health Goals in partnership with VISN 11. The innovation grant is used for Health4Heros, a mobile application. Application development is partnering with the HCI labs in Nashville and Indianapolis.

Project Objectives: The objective of the Health4Heroes iPhone project is to develop a mobile app that will help Veterans integrate their healthcare information, take an active role in their healthcare, and support their healthcare goals. The application will reach Veteran populations and be rated by number of stars provided in feedback. Partnering on the project are Wayne State University developers and human factors experts, VA-CASE project managers, HCI lab at Nashville & Indianapolis, VISN11 subject matter experts, and Veterans groups. Integration with the Veterans' medical data is not planned.

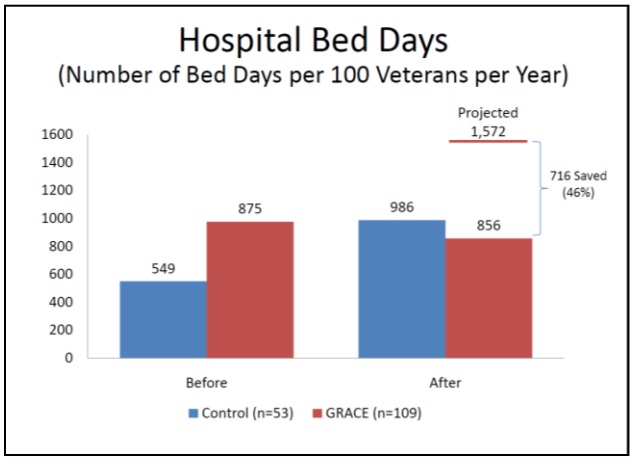
Project Results/Impact (to date): Health4Heroes is in the development stage. Two cycles of testing using HCI have been completed.

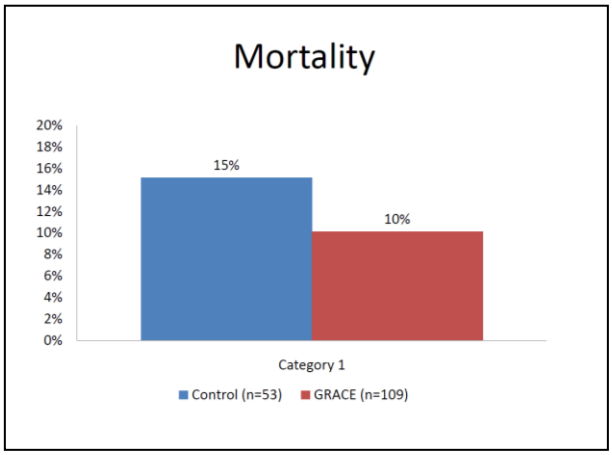
Geriatric Resources for Assessment and Care of Elders (GRACE): VA-CASE partnered with clinical researchers from the IU School of Medicine in a 2-year program funded by the Office of Geriatrics and Extended Care to disseminate and evaluate the Geriatric Resources for Assessment and Care of Elders (GRACE) model for home based geriatric assessment and care management to the Roudebush VAMC.

Project Objectives: Our goals under the Tech4Impact Diffusion Grants Program are twofold. The first goal is to enhance current activities of care planning, tracking, and communication; the second is to use computer-based technologies to facilitate program evaluation ensuring fidelity to the GRACE model and measuring quality of care indicators. Ensuring fidelity to the GRACE model and demonstrating improvement in quality of care indicators will be critical to the sustainability of GRACE in the Indianapolis VAMC and to the eventual dissemination of GRACE nationally within the VA healthcare system. These functions will also serve to guide and improve overall program quality.

Project Results/Impact (to date): VA-CASE provides program management, analysis and clinical informatics resources to this program. To date, over 174 patients have been enrolled in this program. Analysis of project data with HSR&D is ongoing to determine effectiveness. Current results (May 2011) indicate ~30% reduction in 30-day readmission and mortality rates as shown in the graphs below.

A review by the national program office was conducted to assess the clinical documentation in CPRS. The GRACE web-based assessment was replicated in clinical reminder format for CPRS and other documents were created specific to the address the needs of geriatric population.



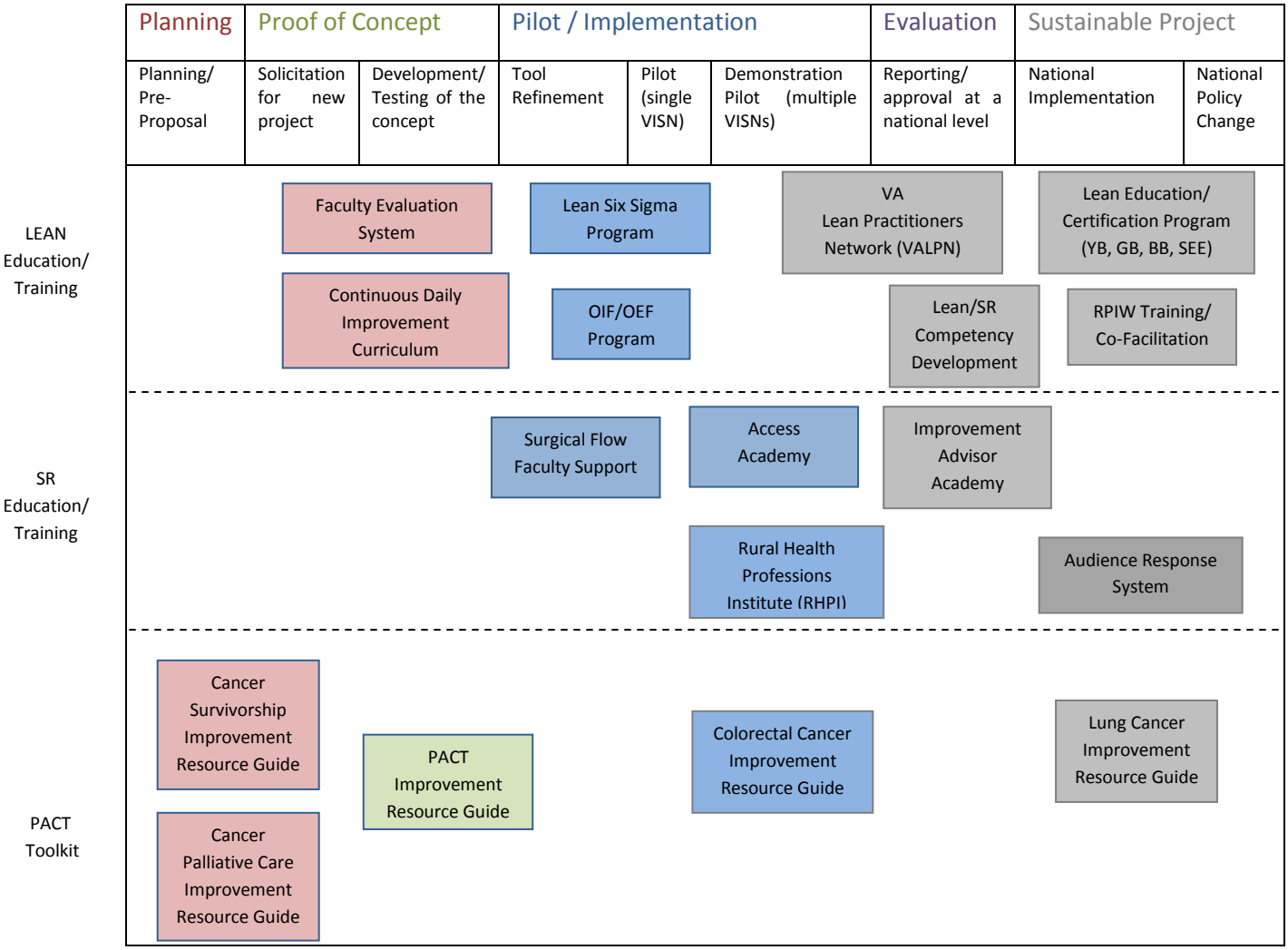


D. Professional Development Programs

The Professional Development Program is the newest program for VA-CASE. The Professional Development Program was originally incubated under VE-TAP and was instituted as an independent program in 2011. Professional Development is primarily focused on educational programs related to OSE disciplines and methods. The program is a leader in developing curriculum and providing facilitation skills in the VA-TAMMCS model of Lean tools and concepts.

Drawing from expert staff with many years of Lean educational experience, the Professional Development Program is able to deliver high quality educational venues that meet the specific needs of our customers. Either prior to or in real time, the faculties extensive experience allows educational experiences to be adjusted to the wide variety of venues in which we participate, resulting in a high quality personal experience.

VA- CASE Professional Development Program Project Pipeline



FY09-11 VA-CASE Professional Development Program Project Summary

Lean/Systems Redesign Competency Development

Beginning in 2010, the national program office of VA Systems Redesign partnered with VA-CASE to engage stakeholders around the United States in identifying and prioritizing key Systems Redesign (SR) competencies for four different groups within the VA:

1. VA Executive Leadership
2. SR Points of Contact (PoCs) and Program Managers
3. SR Facilitators and Coaches
4. SR Participants

A series of two-round modified Delphi processes engaged participants from each of the four groups in identifying key competencies related to Systems Redesign. The Delphi processes took place separately, occurred one at a time, and involved different sets of participants. At the conclusion of each Delphi process, an executive summary reported out the main findings for each group.

Project Objectives: The main aim in conducting this multi-group initiative was to inform ongoing planning for Systems Redesign projects and improvement work around the VA, including planning for educational and professional development resources. This entire project was conducted in-house within the VA without additional funding.

In the first round of the Delphi process for each group, participants ranked each item in a candidate set of about 40 competencies in terms of relative importance. Participants used a 7-point Likert scale to indicate the relative importance of each competency (1 = Extremely Low; 7 = Extremely High).

In the second round, participants reviewed the descriptive statistics from Round 1 for each item (i.e., means, standard deviations and histograms) and re-ranked each competency in light of this additional information. Round 2 featured a trimmed set of competencies because the lowest-ranked competencies from Round 1 were dropped (i.e., items with means greater than one standard deviation below the overall mean).

The end result of the two-round modified Delphi process was the identification and prioritization of a core set of Systems Redesign competencies for each of the four groups.

Project Results: Because Delphi processes have now been completed for VA executive leadership, SR PoCs and Program Managers, SR Facilitators and Coaches, and SR Practitioners, it is possible to compare results across all four groups. This direct comparison provides a window on the different perspectives of the four groups vis-à-vis Systems Redesign.

The Table below provides a direct comparison of the "Top Ten" Systems Redesign competencies identified by participants in the Practitioner, Facilitator/Coach, PoC and executive leadership groups. Colors link similar competencies across the four columns.

Table 1. Direct comparison of Top 10 Items from SR Practitioner, Facilitator, PoC and VA Executive Leadership Delphi Processes.

SR Practitioner			SR Facilitator/Coach		SR PoCs and Program Managers		VA Executive Leadership	
Rank	Competency	Mean	Competency	Mean	Competency	Mean	Competency	Mean
1	communicating effectively with SR teams	6.68	understanding role of the AIM statement	6.73	understanding SR knowledge, tools and methodologies	6.74	seeing that guidance to teams is provided to ensure alignment with strategic/program goals	6.78
2	understanding principles of teamwork and team dynamics	6.59	communicating effectively with SR teams	6.72	understanding principles of teamwork and team dynamics	6.67	ensuring that Systems Redesign initiatives are appropriately resourced	6.67
3	knowing how to perform Voice of the Customer analysis	6.50	teach SR concepts, methods, and skills to improvement team members	6.69	ensuring appropriate opportunities for staff to engage in SR training and education	6.62	seeing that overall SR results are evaluated to ensure alignment with facility and/or VISN SR strategic & tactical goals	6.59
4	understanding SR knowledge, tools and methodologies	6.50	principles of teamwork and team dynamics	6.66	the VA-TAMMCS Framework	6.59	ensuring that SR initiatives are selected carefully from the pool of possible projects	6.42
5	managing resistance to change from stakeholders in affected work environment	6.32	the VA-TAMMCS Framework	6.53	seeing that guidance to teams is provided to ensure alignment with strategic/program goals	6.51	removing barriers in a timely manner related to implementation	6.37
6	understanding role of the AIM statement	6.27	how to sustain SR projects over time	6.47	seeing that overall SR results are evaluated in alignment with facility and/or VISN SR goals	6.44	providing visible support for the adoption of SR	6.33
7	understanding factors related to resistance to change	6.27	knowing how to conduct Process Mapping	6.45	how to develop and/or interpret a Project Charter	6.38	effectively deploying Management Oversight Team & Champion team (& committees)	6.30
8	selecting team members for a SR project	6.27	selecting team members for a SR project	6.37	selecting team members for a SR project	6.38	ensuring that SR projects are appropriately chartered	6.19
9	knowing how to do Process Mapping	6.14	knowing continuous improvement methods	6.34	principles of sustainability	6.36	removing barriers in a timely manner related to sustainability and spread	6.15
10	knowing how to spread SR approach to new improvement projects	6.14	knowing how to spread SR projects over time	6.21	removing barriers in a timely manner related to sustainability and spread	6.31	ensuring appropriate opportunities for staff to engage in SR training and education	6.15

Some notable findings from Table 1:

- There are ten different "colors" in Table 1, indicating that 10 SR competencies appeared in the "Top 10" lists of at least two of the four groups.
- The single competency area that spanned all four groups was supporting the spread and sustainability of SR improvement projects.
- Every item in the "Top 10" list for both SR Facilitators/Coaches and SR PoCs also appeared in the "Top 10" list of another group in Table 1, suggesting that SR Facilitators and PoCs play a key role in coordinating and mediating SR-related activities across the organization.
- The only specific SR methods to make any "Top 10" list across the four groups was "process mapping" for the SR Practitioners and SR Facilitator/Coaches and "Voice of the Customer analysis" for SR Practitioners.
- The VA-TAMMCS framework was identified as a "Top 5" item for both SR Facilitators and SR PoCs.

Project Impact: The results from this project have significantly informed the Lean and SR Education and Certification Programs by providing 1) a benchmark of required competencies for Lean and SR Education Programs and 2) a standard framework for developing competency requirements.

Lean Training Education/ Certification Program:

Developed in partnership with the Mid-West Mountain Region (MWM) VERC, this program aims to provide VA staff with the knowledge, skills, and support to implement and sustain successful Lean Healthcare projects within VHA healthcare facilities. The formal training sessions incorporate both didactic and hands-on learning experiences in Lean Healthcare methods and techniques. These courses are complemented by a VHA Lean Healthcare Community of Practice established specifically to support the ongoing implementation of SR/Lean projects within the VA. The entire program explicitly aligns Lean Healthcare methods, tools and techniques with the national VA Systems Redesign framework of Team/Aim-Map-Measure-Change-Sustain (TAMMCS).

Program Objectives:

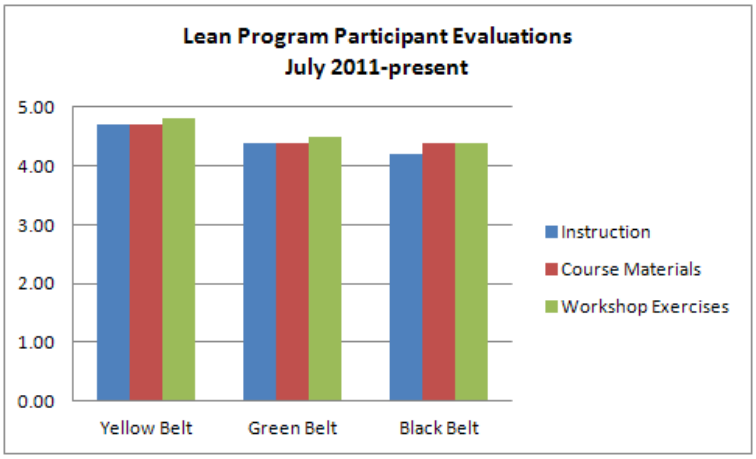
- Provide training and educational programs to develop, evaluate, and spread OSE-based, just-in-time (JIT) Lean training programs for management and front line clinical and administrative staff.
- Build interdisciplinary teams composed of facility systems redesign and VA clinical administration staff will partner with faculty from affiliated academic institutions to build and test novel methods for JIT instruction of OSE methods and tools within the context of the current VISN11 and National Systems Redesign improvement frameworks.
- Partner with the other VERCs to spread standardized Lean training and certification across the VHA enterprise.

Program Results:

The VA-CASE/Purdue Lean Training, Education and Certification Programs were developed at the Yellow Belt (Practitioner), Green Belt (Facilitator), Black Belt (Program Manager), and Senior Executive level (SEE). Within early FY10, these programs reached national dissemination and have become the model for VHA Lean Education for the national VERC program.

Project Impact:

From FY09-present, the VA-CASE Lean Program has provided over 1100 days of Lean Training/co-facilitation to over 5700 VHA staff throughout the VHA enterprise. In July 2011, VA-CASE implemented a formal evaluation program for the Lean Education Program. Within this evaluation program, participants are asked to provide feedback on the quality of instruction, course materials and workshop exercises. Results from the evaluation indicate that majority of participants rate the VA-CASE Lean Educational offerings within an excellent rating (>4.0) as indicated in the chart below:



The number of courses/participants for VA-CASE Lean Training Programs is shown in the following table:

Lean Training/Co-Facilitation	FY09-present	
	# of Sessions	# of Trainees/ Participants
Yellow Belt	67	2680
Green Belt	31	1240
Black Belt	30	600
Senior Executive Experience (SEE)	11	440
Rapid Process Improvement Workshops (RPIWs)	14	280
Leading Organizational Improvement Workshops (LOI)	10	400
Return on Investment Analysis (ROI)	2	80
Total Lean Training/Co-Facilitation FY09-Present	**165**	**5720**

Lean Certifications at the Yellow Belt, Green Belt and Black Belt levels are offered through Purdue. Certifications requires project participation, completion of a competency based knowledge assessment and submission of a project summary document (A3). A summary of certifications is listed below:

Lean Certifications (through Purdue)	In Process	Completed
Yellow Belt	222	52
Green Belt	62	13
Black Belt	92	7

Additionally, the courses and certification programs developed are now the baseline curriculum used by all VERCs and are available for VHA facility use in their improvement education programs.

VA Lean Practitioners Network (VALPN) is a networking group of VHA employees with an interest in Lean applications within Healthcare. This network was developed and has been facilitated by Carlos Garcia, VA-CASE Staff/Faculty member.

RPIW Training/ Co-Facilitation Program:

RPIW workshops are a project-based approach to provide rapid application of the VA-TAMMCS model over a period of ninety days. Planning is typically six weeks prior to the RPIW workshop. The planning is done by a Management Guidance Team, which is composed of a Senior Leadership sponsor, Service Chiefs and middle managers from the targeted area for the improvement. A Rapid Process Improvement Workshop (RPIW) Facilitator or Coach is also typically involved. The RPIW workshop itself is five days or 40 hours of dedicated front-line team work. Following the RPIW week, the front-line process improvement team will continue to implement identified improvements working through the pilot implementation plan for a 90 day period. At 90 days post-RPIW, the front-line process improvement team presents the final RPIW team results as well as a transition plan for additionally identified items.

Program Objectives:

- Develop an understanding of techniques used to facilitate systems redesign efforts within clinical micro-systems.
- Understand how RPIWs are used to overcome barriers to creating a culture of continuous improvement.
- Facilitate RPIWs within their own facilities.
- Teach other VA employee's basic systems redesign concepts and tools.

Sites supported in FY09-11 include:

- VISN4 – Philadelphia VAMC: Missed Opportunities Reduction

- VISN7 – Atlanta VAMC: Substance Abuse Treatment Clinic Lead Time Reduction
- VISN8 – Orlando VAMC: Outpatient Pharmacy Pickup
- VISN8 – Tampa VAMC: MOVE! Program Optimization
- VISN10 – Surgical Capacity Optimization
- VISN10 – Chillicothe VAMC: EKG Ordering and Completion Process
- VISN11 – Non-VA Care Coordination (NVCC) RPIW
- VISN19 – Helena VAMC Reduce the cycle time of scheduling, completing and communicating mammograms within five Montana medical centers
- VISN20 – Anchorage VAMC, Design, Optimization and alignment of administrative and business processes with patient aligned clinical service optimization and alignment
- VISN20 – Spokane, WA Behavioral Health Services Care Coordination and Teamwork Optimization
- Disability Evaluation System RPIW
- Tort Claims Process RPIW

VISN11 NVCC RPIW Team

Improvement Advisor Academy Program:

VA-CASE has partnered with the Veterans Health Administration (VHA) Office of Systems Redesign (SR) in collaboration with the (VHA) Employee Education System (EES) to provide primary OSE support for the national SR Improvement Advisor Academy (IAA) in OSE Tools and methods in FY10/FY11.

Program Objectives:

The objectives of this program include the following:

- Learning by Doing -- During the course of the IAA 12 month period each participant will facilitate Improvement projects with three teams: one from each area of Systems Redesign, Inpatient, Outpatient and Business Improvement. Projects will be solicited from stations and VISNs.

- Just in Time Learning -- VHA and VA-CASE Subject Matter Experts (SMEs) will serve as faculty and mentors. VA-CASE will also provide core resources for mentoring and coordination of the details of the IAA. This experienced pool of experts will be available for consultation and guidance within a relatively short time frame. As participants find the need for consultation in specific areas, SME and IAA faculty will be made available on an as-needed basis to provide additional real-time learning experience within the IAA program.

- Curriculum Objectives – Within the IAA program participants will:
    - Demonstrate skill in leading, coaching and facilitating improvement teams.
    - Develop expert knowledge in performance improvement, systems redesign methodologies and systems redesign program management.
    - Complete a minimum of three projects, aligned to the local organization's strategic priorities and preapproved by IAA faculty and planning committee, utilizing the skills developed during the course of the academy.
    - Serve as experts and coaches to peer networks in support of frontline change.
    - Demonstrate and apply the knowledge and skills needed to foster widespread use of systems improvement tools and techniques in addressing every day as well as high priority issues.
    - Develop expertise in data capture, data management and data analysis within the context of improvement initiatives.

Leading Organizational Improvement Workshop:

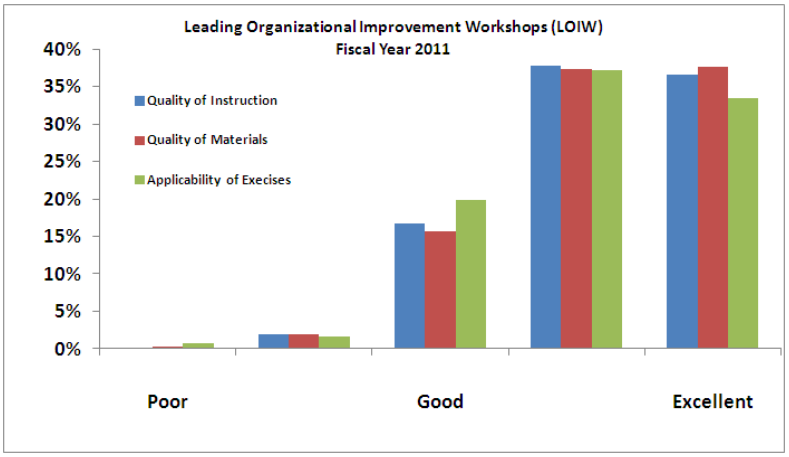
VISN11 VA-CASE has partnered with the National SR Leadership Committee and Office of Systems Redesign to provide facilitation, coordination, and implementation support for the roll-out of the Senior Executive Systems Redesign Workshop. VA-CASE is providing implementation support services to the National Systems Redesign (SR) Program Senior Executive Workshop throughout the 2-year Senior Executive Workshop cycle. This support includes pre-work and planning meetings as well as workshops conducted across 23 VISNs nationally through FY11-12.

Workshop Objectives:

The objectives of this program include providing:

- Introductory administrative/informational support of VISN/Facility leadership to assist with workshop coordination.
- Pre-assessment support (in partnership with NCOD) of VISN/Facility current use of SR tools, methods and culture.
- Facilitative, administrative and coordination support to the National SR Program in support of each on-site Senior Executive Workshop.
- Facilitation/training/ coaching in highly effective SR methods to National VHA Senior Executives through customized senior executive Systems Redesign workshops.
- Post-assessment support of VISN/Facility use of SR tools, methods and culture following the workshop program.

Evaluation Results from the 10 LOIs conducted in FY11 are shown below. Note than over 90% of Senior Executive participant's rate the program as Very Good to Excellent.



Access Academy -- VA-CASE VERC has partnered with Systems Redesign and the MWM VERC to develop and present an academy specifically focused on Access. VA-CASE will provide curriculum development skills as well as provide faculty and mentors for the nine-month long program.

Project Objectives:

In collaboration with SR, develop curriculum and facilitate learning that meets the following curriculum goals. Upon completion of the course, participants will be able to:

- Demonstrate understanding of Access and office efficiency principles, measurement, and when/how to apply it
- Demonstrate understanding of the VA-TAMMCS framework
- Demonstrate understanding and the execution of improving access key principles and strategies under the categories of: FOR an appointment, AT an appointment, and BETWEEN appointments
- Demonstrate understanding the components of Service Agreements and when to utilize them
- Understand the inter-working of the Patient Care Aligned Team (PACT) and clinic access
- Understand the inter-workings of Specialty Care and the role of specialty access venues
- Coach and/or teach Access improvement principles to VHA Medical Center staff incorporating accelerated and experiential learning techniques
- Serve as the facility outpatient clinical access systems improvement expert

Project Impact: The course begins in January 2012.

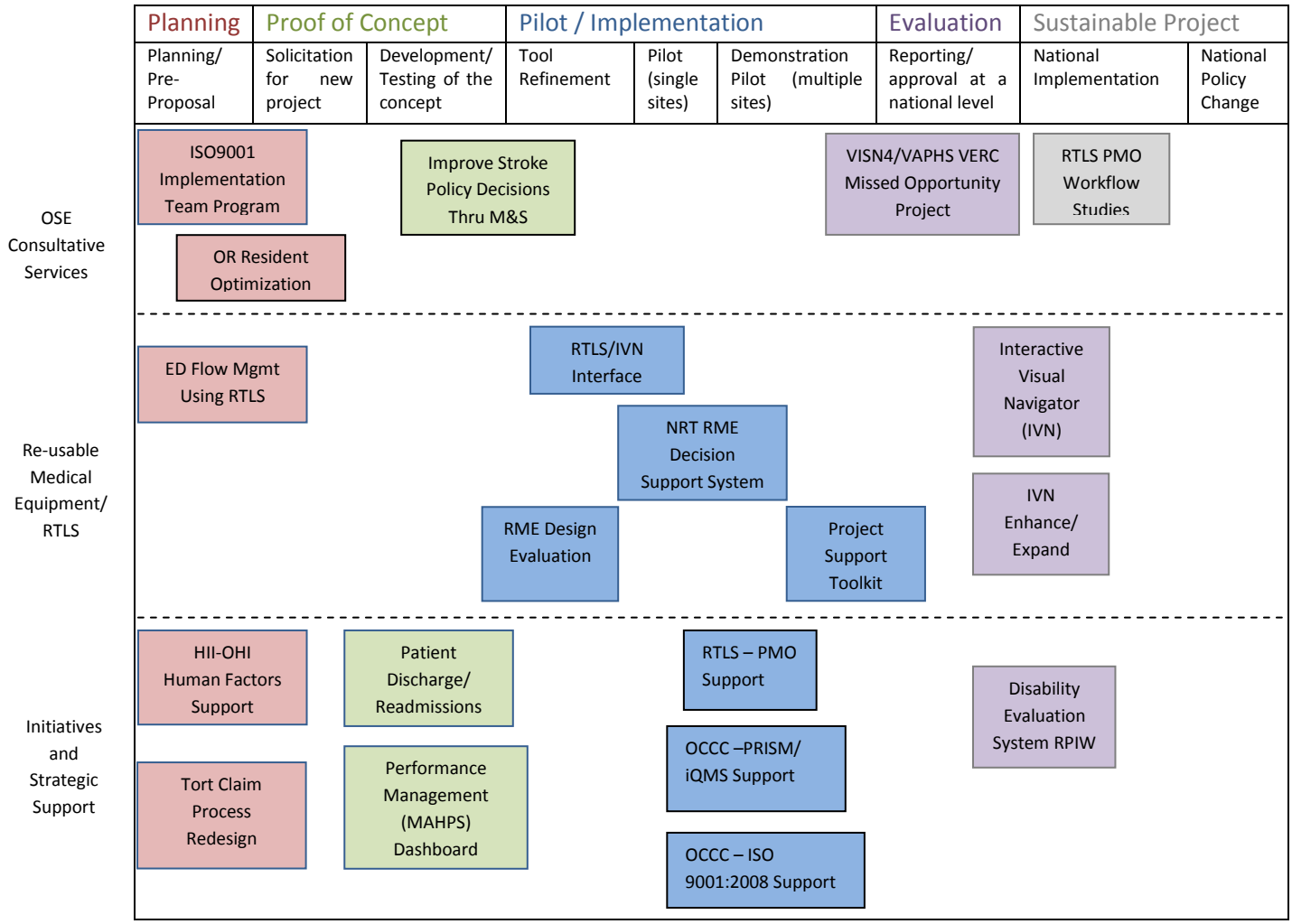
E. VHA Engineering Technical Assistance Program (VE-TAP)

As part of an integrated strategy to provide veterans with timely access to quality health care services, VE-TAP is the mechanism to provide training, mentoring, facilitation, and implementation in applying OSE rapid deployment strategies, and advanced OSE tools within VHA, VISN11, and National Systems Redesign Programs. Lessons from projects are applied to future clinical and administrative systems redesign initiatives. The VA-CASE VE-TAP budget was approximately $1.25M/year, with 20% ($.25M) allocated from VA-CASE core funds. The primary innovation incubation mechanism of VA-CASE is the VE-TAP program.

VE-TAP is organized into the following functional areas:

- Operational Systems Engineering (OSE) Consultative Services Programs
- Re-usable Medical Equipment (RME)/Real Time Location Systems (RTLS) Programs
- Initiatives and Strategic Support Programs

VA- CASE VHA Technical Assistance Program (VE-TAP) Project Pipeline



Operational Systems Engineering Consultative Services Projects

VHA Real Time Locating System Program Management Office (RTLS PMO):

This project provides services in support of RTLS program office objectives. In FY10, project support included providing services to RTLS PMO in support of VHA Enterprise RTLS acquisition, providing services to investigate Work Flow studies for pre-installation of RTLS into Catheterization Laboratories and SPD for the RTLS Early Adoptor sites, providing consultation services to PMO in RTLS technologies and roll-out of systems into VHA health care environments, and completing RTLS Pre-installation Work Flow Surveys in 6 facilities and provided reports on SPD and CATH Lab work flow.

VISN4/VAPHS VERC Missed Opportunity Project:

This Collaboration between VAPHS VERC, University of Pittsburgh, Wayne State University, and VA-CASE/ VISN11 will provide tools, RPIW consultation, and process evaluation techniques to assist facilities with improving missed opportunity processes and for use with the Patient Aligned Care Team effort. The development of a no show model will provide an effective tool to accurately predict the rate of missed opportunities. Teams will be trained under the RPIW Training / Co – Facilitation Program to implement these improvements and VE-TAP Education Consultation Services will be provided to complement the education program.

Program Objectives:

- Improve, test, validate, and automate No Show Prediction Model.
- Educate teams at facilities in SR improvement processes using the RPIW methodology.
- Provide assessment support for the education process.

Project results and impact to date:

- Provided tools, RPIW consultation, and process evaluation techniques to assist facilities with improving missed opportunity processes and for use with the Patient Aligned Care Team effort.
- Provided data extraction routine to PHCS to assist with UPitt project and provide data for WSU model validation.
- Provided data extraction routine to VISN 11 facilities that are study sites for the WSU model validation and pilot.
- Established Strategic Review Team at VE-TAP to assess potential uses for the No-Show technique in other areas. Team has identified Patient Re-Admittance Improvement Project as one use.
- Conducted RPIW at Pittsburgh for the “Train the Trainer” session for the Project.
- Continued No-Show model validation.

For FY12, project will continue model validation, facility support, and support to VAPHS efforts.

Improve Stroke Policy Decisions through M&S:

This project is designed to identify rigorous methods to conduct sensitivity and uncertainty analysis with the existing VA Stroke Strategic Planning Model to understand the implications of adding additional resources, improve performance of resources allocated to stroke prevention and mitigation, and improve patient safety to mitigate risk of stroke. The project goal is to provide a working model to inform Stroke QUERI strategic planning and VA Operations and experiment with the model to understand its dynamics and create scenarios by varying parameters representing policy. Work to date has included replicating the System Dynamics model previously programmed in Vensim as a System Dynamics model programmed in AnyLogic and ithink, developing a written explanation of the analytical objectives for the sensitivity/uncertainty analysis, reviewing methods in and outside of health care field, and identifying and describing suggested methods to implement.

VE-TAP Re-usable Medical Equipment (RME)/ Real-Time Location Systems (RTLS) Programs

Interactive Visual Navigator (IVN) Program:

Developed by our Wayne State Faculty, with Dr. Kai Yang as the lead, in partnership with the Detroit VAMC - IVN provides an automated and dynamic work flow process incorporating systems and human factors engineering principles to ease the burden on the technician, reduce error in re-processing, provide automated data collection, support Quality Management requirements and reporting, and provide safer and better care to the veteran. The system development and deployment includes an iterative user-centered design process that relies on user feedback at each stage in the Continuous Engineering Development (CED) cycle.

IVN is a Web-based application that presents interactive, multimedia instructions for the RME reprocessing procedure. IVN captures time and results data to confirm accurate and complete reprocessing. IVN presents work instructions using touch screen technology in the form of modules. An IVN module is specific to each model of equipment. Manufacturers' instructions are followed precisely in the construction of the work instruction module (WIM), and WIM content is approved by relevant personnel in the facility management structure to ensure WIM conformance with relevant guidelines, standards, and clinical practice.

IVN is designed to interface seamlessly with Real Time Locating Systems (RTLS) and integrated Quality Management System (iQMS) solutions. The technical support that the VE-TAP group is providing will insure compatibility with a system of systems development currently in progress with VHA enterprise solutions. All efforts are designed to move RME re-processing towards ISO 9001:2008 conformance: a goal established by the national RME steering committee.

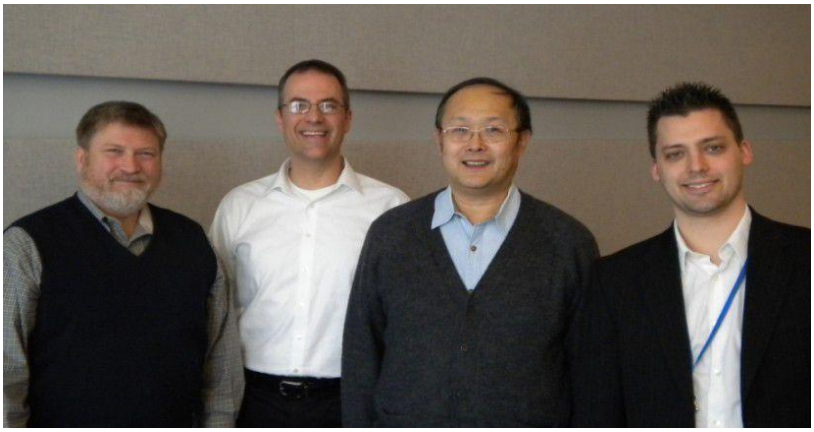
IVN facilitates consistency of practice. IVN also provides standardization and transparency from front line to front office. The project provides an interactive system that can deploy on a stand-alone PC, network connected PC, or as a virtual application on a network. The application uses Human Factors engineering processes in the development of WIMs, designed to ease the work-load burden on the technician, automate various protocols, and record data. Most operators currently use a corresponding paper-based SOP, placing it on the table top, or hanging the SOP from a hook while following the procedure. Since the SOPs are very complex, this process is highly prone to human error. Since the instructional steps are numerous, the omission of steps is very easy. The steps are also often long and complex, leaving the opportunity for incorrect execution or omissions. The development and implementation of the Interactive Visual Navigator (IVN) system mitigates these potential errors, improves the work conditions for the technician, and reduces risk to the Veteran.

IVN is currently configured to support endoscope re-processing; however, IVN can and will support any RME or other equipment with a workflow process procedure, including corrective and preventive maintenance procedures. The system is also designed to interface with integrated Quality Management Systems (iQMS), Near Real Time Modeling & Simulation systems (NRT M&S), and ISO 9001 conformance systems. Additionally, the system can interface with Real Time Locating Systems (RTLS) to provide a system of systems configurable approach to automate or semi-automate asset tracking and processing, and maintain quality control, education, training, and competency requirements as appropriate.

IVN is operational at Detroit VAMC, in validation phase prior to operational use at Indianapolis VAMC, in WIM build verification phase at Ann Arbor VAMC, and in pre-implementation build phase at Saginaw, Danville, Battle Creek, Northern Indiana, Louisville, and Miami-Broward VAMCs.

<u>Project Objectives:</u>
IVN has the following key objectives:

- Display digitized, human factors based SOP, using the approved manufacturer's procedure, into computer screen slices in which the screen appearance, contents, and tasks combinations are all optimally designed, based on human factors engineering to avoid and reduce human errors.
- Automatically capture reprocessing tasks subdivided into process stages, and for each reprocessing job, capture the processing time for each stage for quality control and management (QMS), process benchmarking, and bookkeeping. Captured processing time history facilitates the discovery and correction of reprocessing irregularities, addressing non-compliance, and reducing unwanted process variations.
- Incorporate techniques to reduce and eliminate error, such as forced clocks, picture and video illustrations, and voice reminders, into IVN to complement the instruction set.



IVN Development and Implementation Team

- Manage input-output and report information that provides managers with the tools to track reprocessing jobs, equipment, and case histories that can significantly improve RME traceability, and RME availability.
- Provide an infrastructure build to allow integration and interface capability with RTLS solutions, iQMS solutions, and Near Real Time Modeling and Simulation Systems to support a Web Based System of Systems approach to automated solutions and support of ISO 9001 processes.
- Provide a dynamic, configurable tool that is easily adapted to other work flow processes.

Results/ Impact:

The following tasks were completed in FY10 and FY11:

- IVN Version 1.3.4 with improved features deployed.
- IVN/SOP data capturing template app: This template app is designed to collect text/files/layout information for creating IVN module context for any RME reprocessing task, and is compatible with the OneSource document control web-based software.
- Converter Module: This module can automatically convert a populated IVN/SOP data template into a workable IVN module. Given that as many as 200-300 different scope models are used in VHA, this converter program has saved time to create IVN WIMs.
- Management input/output reporting module: This module can facilitate the input of operator information, scope information, retrieve correct WIM for each scope, record processing data, populate dashboards, and generate various types of report.

With the support of VHA System Redesign, Phase 2 of the IVN development, deployment, enhancement, and expansion was completed in FY11. In Phase 2, the Team accomplished the following tasks:

- IVN modules developed in Phase 1 field tested in Detroit VAMC and incorporated user feedback to improve Phase 2 versions of IVN modules during the CED cycles; a mature and field tested module format resulted for a larger deployment cycle.
- Input/output and reporting module in-situ testing and improvements incorporated.
- Installation of IVN at Indianapolis VAMC as a second field test and development pilot site to support a larger set of endoscopes supported by IVN.

- Integration of the Competency and Training Tool, with IVN to provide iQMS bi-direction automated work process data to ensure only a properly trained operator that is currently competent for the identified scope can access the specific scope IVN module and process the identified scope.
- Generation of an IVN module library for the different scope models used in VHA facilities, using the converter program with updated format from the CED cycles.
- Developed modules for IVN use with Medivator, Sterrad, Steam Sterilizer, and EtO systems.
- Commenced implementation into Ann Arbor VAMC Endoscopy Clinic.
- Commenced IVN builds and implementation for remaining VISN 11 Sites: Saginaw, Battle Creek, Danville, and Northern Indiana.
- Commenced data collection for ISO9001:2008 and iQMS:PRISM pilot sites for IVN implementation in FY12.

Because of the modular IP design methodologies and the CED techniques developed by the IVN Team, deployment of IVN to other VHA facilities can occur concurrently. The Detroit and Indianapolis sites will provide a test-identify-build-test-improve-deploy (TIBTID) "Sandbox" and validation capability to maintain a parallel and concurrent CED cycle as the team deploys IVN to additional facilities. The concurrent deployment of IVN technology and further technology developments and integration with other VHA improvement solutions can then occur without disruption to VAMC operations.

IVN Implementation Schedule:

FY11:

1. Detroit VAMC: Pilot implemented and system operational, validated Endoscope modules for Medivator.

2. Indianapolis VAMC: Pilot implemented, validated Endoscope modules for Medivator and Sterrad.

3. Ann Arbor VAMC: Pilot implementation in progress, Endoscope modules and management module build in verification phase.

4. Five remaining sites in VISN 11: Pre-implementation in progress, equipment ordered, collecting Endoscope and management information and module builds in progress.

FY12:

1. Complete VISN 11 implementation and interface with RTLS.

2. Implement in VISN 10 facilities and interface with RTLS.

3. Implement and interface with ISO 9001:2008 modular pilot sites – 7 sites.

4. Implement and interface with iQMS: PRISM Alpha pilot sites – 3 sites.

FY13-14:

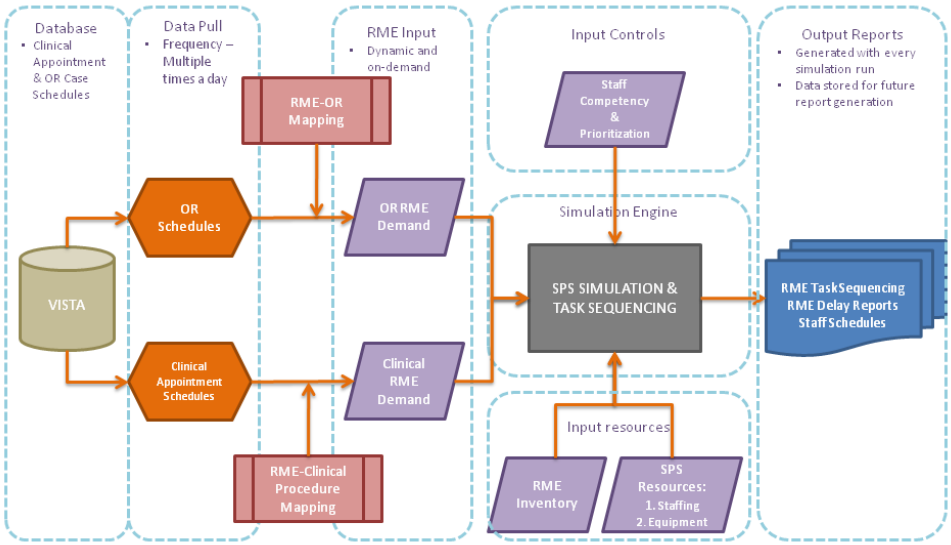
Continue IVN Enterprise implementation at all VISN / facilities reprocessing RME with goal of completing all facilities by end of FY14.

Project Support Toolkit:

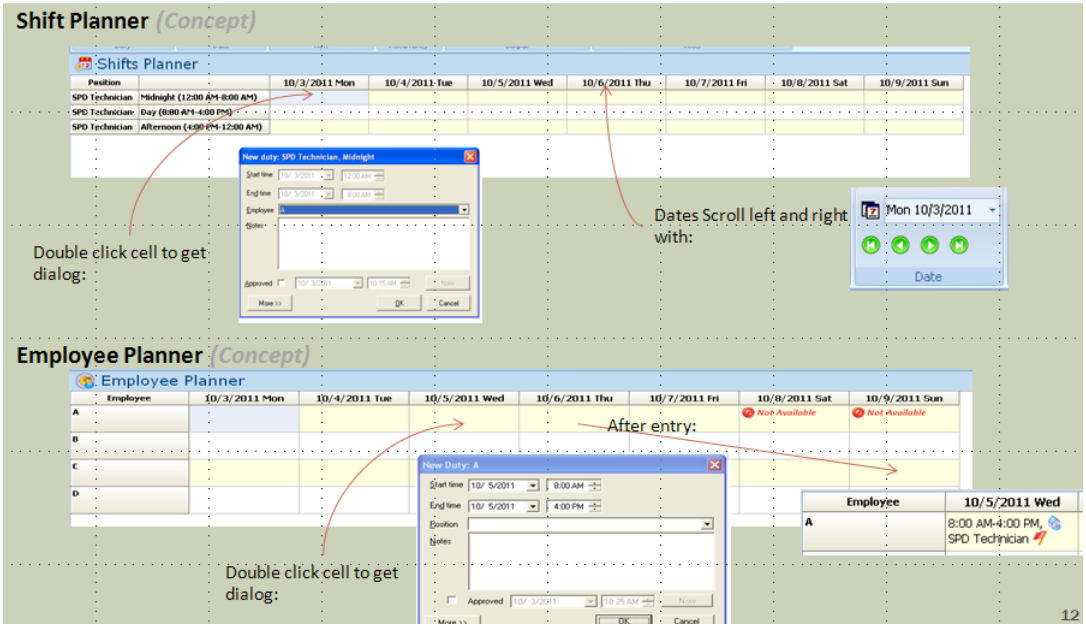
SPS Training and Competency Tool Project: This tool is part of the Project Support Toolkit and is designed as a stand-alone macro routine or as a functional module integrated with other applications. This tool is currently in use in Detroit VAMC SPS, and is incorporated into all IVN modules to provide an automatic integration of education and training competencies of the SPS operators with the equipment processes that they are qualified to perform. The tool also provides automatic management updates in either report or dashboard format, and alerts to identify abnormal or unqualified performance of a procedure.

ACCESS Profile Project: This middle-ware software application is part of the Project Support Toolkit and is designed to allow data exchange between systems modules and current VHA legacy software applications such as VistA and CPRS, while maintaining required security and privacy requirements to data access. Currently, this application is in use with the Missed Opportunities Project team. Additionally, this application was used in support of the Telephone Care Collaborative projects within VISN11.

Integrated Solutions System of Systems (ISSS) Deployment Framework Project: This project is part of the Project Support Toolkit and consists of a development and deployment framework to provide consistency in design, develop, and incorporation of solutions, modules, and tools to interface with other work process control systems, iQMS solutions, RTLS solutions, NRT M&S solutions, and ISO 9001/2008 conformance solutions. Elements of this project were initiated in the FY10 Phase I IVN Program and will continue into FY11 IVN phase 2, and are incorporated into the other projects associated with IVN. A visual display of the ISSS framework is shown below:



RME Near Real Time Decision Support System (RME NRT DSS):
(previously called Capacity Planning and OM within SPS Project)



This project encompasses the entire sterile processing functional cycle, beginning with the point of use, continuing through transport, decontamination, cleaning and sterilization, preparation and packaging, storage, and sterile transport return to the point of use. The overall goal of this project is to improve the efficiency and quality outcome of SPS processes including sterility assurance and achieving staff and patient safety. The models are flexible and configurable to meet different facility needs and workflows.

The models are developed to use both historical and real-time data on RME usage and inventory that will be available from Sterile Processing Service (SPS), Real Time Locating Systems (RTLS), Interactive Visual Navigator (IVN), integrated Quality Management Systems (iQMS), ISO 9001 implementation protocols, and other facility modules replicating workflow processes that affect RME processes. This System of Systems (SoS) approach supports the integrated framework for an automated future state for RME and SPS.

Currently, the Operating Room module is in pilot at Detroit VAMC. The prototype module for SPS is developed and undergoing trials at Detroit VAMC. The modules will constitute a System of Systems (SoS) design to provide plug-n-play module additions to build a virtual, tactical facility specific configurable decision support system for use by mid level managers to assess current state, build options to plan a future state, and implement a solution to overcome barriers. The FY12 plan is to integrate the current models into a functioning configurable integrated system for OR-SPD interactions and introduce other clinic interactions, such as ER, Lab and Radiology. This RME near real time work planning and optimization system can improve the following performance metrics in SPS operation:

a. SPS Efficiency:

   i. Cycle time: Optimize the cycle time to bring dirty RME to a ready-to-use condition (e.g., by optimized sequencing and prioritizing work process flow to take advantage of staff qualifications and availability)

   ii. RME Inventory levels: Optimize the number of RME waiting for processing in all stages

   iii. RME Availability: Reduce errors in incorrect transfer and issue of RME

b. Staff utilization: Level and optimize staff utilization at the manager level based on known conditions or in-situ changes

c. Safety Error Rate: Improve efficiency and reduce workload fluctuations to reduce error rate

d. Impact on RME Users: Case Cancellation Rate reduction due to absence of RME: Short term scheduling and add-on case decisions will be more robust

Project Objectives:

- Improve the efficiency and quality outcome of SPS processes including sterility assurance, and achieving improved staff and patient safety.
- Dynamic interface with other VHA efforts to provide a system of systems approach to improving SPS processes.
- Integrate OR case scheduling tool which provides RME supply-demand information sharing between SPS and OR.
- Improve the efficiency of the SPS through staff and equipment capacity planning and short-term (tactical) operational management of SPS work flow and resources.
- Increase RME availability and improve sterilization quality by reducing safety incidents through more effective SPS processes, utilization, and load balancing.

Project Results to date:

- Developed, tested, and validated near real time SPS operations management and planning tools
- Developed, tested, and piloted OR management and planning tools
- Created an operational model for scheduling and sequencing of the RME sterilization jobs
- Developed simulation model for OR and SPS to manage staff and equipment capacity planning and “what if” scenarios

Design Evaluation for RME Project:

This project will implement a holistic system to monitor, analyze, and evaluate the effectiveness and efficiency of various reusable medical equipment (RME) from different manufacturers. The scope of the effort will cover the life cycle of RME from newly designed equipment to continuous operations and final disposal. The team will develop a combination of methods, including RME design evaluation, RME usage history data collection, and analysis; will derive effective service and maintenance guidelines for different RME; and will derive a performance appraisal system for RME so that a more effective select of RME occurs and inferior RME is discontinued. Work commenced in FY11.

RME reprocessing is characterized by complex human involvement, large number of processing steps, risk of infection due to incorrect execution of reprocessing procedures, and difficulties in elimination of infection sources caused by bio debris. Hundreds of model types for each kind of RME are currently in use. Different model types of same RME, such as endoscopes, perform similar functions, but their reprocessing can be very different and difficult. For certain types of RME, reprocessing can be accomplished much easier and the risk of infection can be considerably less if better engineering design is used, with fewer matted surfaces, sharp angles, occluded dead-ends, rough or pitted surfaces, square corners, dead spaces, and complex jaw assemblies, so as to reduce risk to trap bio-burden and debris.

Project Objectives:

Develop an evaluation method for assessing the level of reusability based on Design for Reusability (DFR) principles and index.

Project results to date:

- Developed an index system for reprocess-ability for RME, so that RME requiring a highly difficult human involvement in reprocessing, excessive number of reprocessing steps, and large number of infection prone design features are identified and gradually phased out. In this way, the risk of infection due to human errors in RME reprocessing is reduced.
- Designed an evaluation method to evaluate RME. This index and scoring scheme can assist VHA in identifying RME with high risk of infections due to human errors in reprocessing. The overall objective is to develop an evaluation method for assessing the level of reusability based on Design for Reusability (DFR) principles and indices. This objective is achieved by incorporating DFR principles into an index for RME design assessment and an RME evaluation framework.

IVN Program Interface with other RME and RTLS Initiatives within VHA:

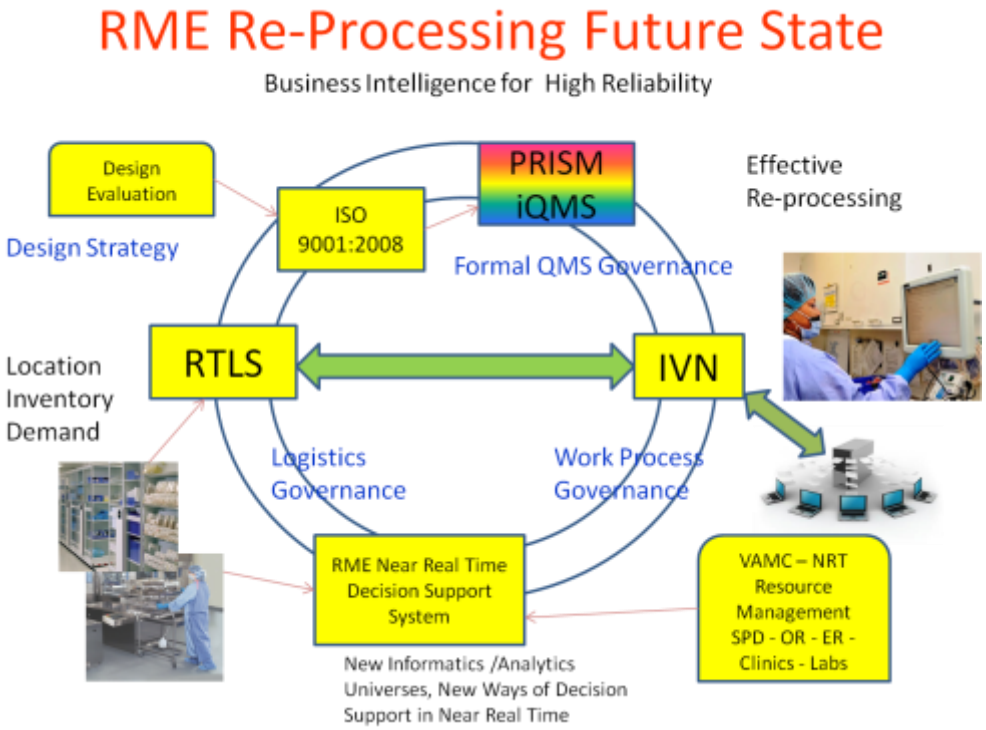
IVN technology supports several initiatives to enhance VHA operations, including the following:

- iQMS initiative – Process for Reliability in an Integrated System for Management (PRISM): An integrated Quality Management System is important to manage the RME process from a safety, quality engineering, and reliability perspective. IVN can interface with iQMS solutions to provide

automated data collection for workflow processes, QI checks and alerts, and network warehousing of the validated, current, and approved IVN modules for document and record control and virtual network distribution. IVN can support and interface with the iQMS system that received a national contract award. This interface will support and is an important element to ensure the quality of the RME process.

- ISO 9001: With all infrastructures developed in RME operations, such as flow charts and FMEA templates, IVN data captures capability, operator training, and quality management and supports the 6 areas of conformance. This will further align the quality process and foster quality culture.

- Real Time RME work planning and optimization: With the capability provided by RTLS and IVN, the location and process status of all RME is feasible. With the scheduling and work load information from users of RME, such as surgery operations, emergency department needs, and in-patient care, managers can quickly identify the type of RME facing a short supply, and the types of RME that are over stocked. Based on this information, managers can plan and schedule SPS operations in a more effective manner. By interfacing automated RTLS and IVN information into a near real time management capability, managers can adapt, flex, and evaluate options to ensure that the proper equipment in the correct amount, and the necessary equipment at the correct location, are available at the required time to support OR, ED, SPD, Lab, and other VAMC areas to support continuous and effective operations.



Real Time Locating Systems (RTLS) – IVN Interface Project:

RTLS technology can provide key technical information to support several essential functions of IVN:

- Identification of RME equipment serial number and model type: with the RTLS tag, the computer host network of IVN can instantly identify the RME equipment in the vicinity of the IVN monitor, eliminating the need for the operator to manually enter the information, and can then automatically check that the operator is currently competent to process the RME; and if not, send an automated alert to supervisors and management. This information is also useful to management to control work flow and processing to ensure priority RME is reprocessed to meet current demand.
- Guide IVN work flow to different work area: In RME equipment reprocessing, a particular piece of equipment may move between reprocessing locations. With the RTLS tagged equipment, the operator can move with the equipment and have the next work location IVN compatible screen recognize the equipment and the operator. IVN automatically displays the correct IVN page at the point of previous completion, to guide operators as the reprocessing continues.
- The combination of the time tracking capability of the IVN system and location tracking capability of RTLS provides an assured and complete traceability of RME reprocessing capability.

IVN is designed to interface with other technologies and solutions. IVN, as designed and as currently built, is complementary with RTLS systems. The interfaced functionality is significantly more capable than each standing alone. The design philosophy for IVN and CED techniques provide an ability to optimize interface and implementation with RTLS. Although IVN deployment is independent of an RTLS deployment within a facility, coordination between the teams is highly desired to optimize the solution and minimize impact on the facility.

To ensure a seamless interface, some software development work is necessary to fully interface the IVN system with the selected RTLS solutions. This development includes the application protocol interface modules that ensure the two systems can communicate and application protocol modules to map RTLS tracking capability of the RME with the reprocessing and equipment usage information.

<u>Project Results to date:</u>

As RTLS is entering VHA facilities, the IVN Team is collaborating with technology companies to obtain data field definitions and data base format structures for the appropriate applications. Application Protocol Interfaces (APIs) are in development by the IVN Team to interface with the RTLS databases that are planned for use with VHA RTLS implementations. This will continue into FY12 as RTLS implementation occurs.

VE-TAP Initiatives and Strategic Support Projects

VE-TAP Consultative Services:

VE-TAP provides Subject Matter Expert services and consultation in support of several VHA programs and offices. These include:

1. VHA Real Time Locating System Program Management Office (RTLS PMO)
2. VHA Office of Clinical Consultation and Compliance (OCCC)
    a. ISO 9001 Education, Training, and Certification Effort
    b. Integrated Quality Management System (iQMS) Project
3. VHA SPS Summit Equipment Utilization Workgroup

The services provided for RTLS PMO involve support to the VHA Enterprise RTLS acquisition project, VERC representation on the RTLS Research and Evaluation Team, VERC/ SR representation on the RTLS Steering Committee, and VERC representation on the Health Efficiency (T16) Automation Workgroup and the RTLS-SPS, Patient Elopement and Staff Tracking, Surgery and Clinical Flow, and the NDR Sub-workgroups. Additionally, VE-TAP has provided services to investigate Work Flow studies for the pre-installation of RTLS into Cathology Laboratories and SPS for the RTLS pilot sites which served as the foundation for RTLS insertion sites for these areas. VE-TAP is also engaged in providing consultation services to PMO in RTLS technologies and roll-out of systems into VHA health care environments.

The services provided for OCCC involve support to the ISO 9001:2008 implementation efforts and the iQMS Project. VE-TAP represented the VERCs during the research and evaluation of commercial ISO 9001 training and certification programs and iQMS solutions, and provided individuals to train and certify as Lead Auditors for ISO 9001 implementation. VA-CASE is a charter member in the iQMS Design Group. This group developed requirements and specifications for an iQMS solution using Commercial off the Shelf (COTS) products. This recently culminated in a national contract to implement a Quality Management System in VHA. Additionally, VA-CASE represented the VERCs in the OCCC-SPS Working Group investigating solutions to automate and optimize SPS work flow.

VA-CASE represents the VERCs in the SPS Summit Group chartered to build the next generation SPS for VHA and specifically serves on the Equipment Utilization workgroup and the Core Business Process Engineering Team.

Patient Discharge/Readmission Improvement Project:

This project is designed to evaluate and improve patient re-admission rates by providing methodologies to identify patients prone to high re-admissibility, and provide solutions to reduce factors that lead to their re-admission following in-patient treatment. This project is in the design, development, and prototype investigative phase.

Multiple ACCESS Hierarchal Performance System (MAHPS) Dashboard:

This project is designed to improve performance management effectiveness, improve performance levels for facility leaders, reduce redundancy in reporting requirements, and improve effectiveness of corrective and preventive action planning. The system will integrate with the ACCESS “All In One” dashboard in pilot at the Detroit VAMC and will use a web-based application structure for high configurability. Work to date includes prototype development and testing, validating web-based technology for the dashboard, and interfacing the ACCESS dashboard.

XI. Budget Overview

A. Budget Summary

In FY09-present (*FY12 estimated), VA-CASE received $15,373,000 of funding from multiple sources as shown in the table below:

Funding Breakdown				
	FY09/10	FY11	FY12*	Totals
Core Funding	$ 1,000,000	$ 1,000,000	$ 1,250,000	**$ 3,250,000**
Previous FY Carry-over	$ 600,000	$ -	$ -	**$ 600,000**
CBO Matching Funds	$ 500,000	$ 500,000	$ 709,360	**$ 1,709,360**
Other Non-Core Funds for Projects/Training	$ 500,000	$ 3,273,000	$ 6,040,640	**$ 9,813,640**
Totals	**$ 2,600,000**	**$ 4,773,000**	**$ 8,000,000**	**$15,373,000**

VA-CASE expenditures by Program are shown the table below. Note that the Professional Development Program will account for ~40% of funding during FY12, with the VE-TAP and Informatics Programs accounting for an approximately 20% contribution from each program.

Expenditures by Program	FY09/FY10		FY11		FY12*	
	Core Funding	Non-Core Funding	Core Funding	Non-Core Funding	Core Funding	Non-Core Funding
Purchased Care Program	$ 500,000	$ 500,000	$ 500,000	$ 690,000	$ 170,000	$ 700,000
Collaborative Programs	$ 200,000	$ 300,000	$ 200,000	$ 1,030,000	$ 220,000	$ 650,000
Informatics Program		$ 100,000	$ 300,000		$ 450,000	$ 1,100,000
Professional Development	NA		$ 100,000	$ 750,000	$ 60,000	$ 3,000,000
VE-TAP	$ 300,000	$ 500,000	$ 103,000	$ 900,000	$ 250,000	$ 1,100,000
VA-CASE Admin Staff	$ 200,000		$ 200,000		$ 300,000	
Totals	$2,600,000.00		$4,773,000.00		$8,000,000.00	

VA-CASE expenditures by type of expense are shown in the table below. Approximately, 50% of VA-CASE funding was allocated to staff and faculty salaries and 34% allocated to contract mechanisms with academic affiliates. Of the remaining funds –5% of funds were allocated to student programs and 8% to travel expenses.

Expenditures by Type								
	FY09/FY10		FY11		FY12*		Totals	
	$ Amount	% of Total	$ Amount	% of Total	$ Amount	% of Total	$ Amount	% of Total
Salaries - Direct Hires	$ 1,000,000	38%	$ 2,550,000	53%	$ 4,120,000	52%	**$ 7,670,000**	**50%**
Salaries - Contracts/IPAs	$ 900,000	35%	$ 1,400,000	29%	$ 3,000,000	38%	**$ 5,300,000**	**34%**
Salaries - Students	$ 300,000	12%	$ 300,000	6%	$ 100,000	1%	**$ 700,000**	**5%**
Materials/Supplies	$ 80,000	3%	$ 100,000	2%	$ 180,000	2%	**$ 360,000**	**2%**
Lean Certification	$ 50,000	2%	$ 33,000	1%	$ -		**$ 83,000**	**1%**
Travel	$ 270,000	10%	$ 390,000	8%	$ 600,000	8%	**$ 1,260,000**	**8%**
Totals	**$2,600,000**		**$4,773,000**		**$8,000,000**		**$15,373,000.00**	

*FY12 amounts estimated

B. Cost/Benefit Analysis

The current cost/benefit analysis for VA-CASE can be derived from two sources: 1) savings as compared to the purchase of Industrial Engineering and Informatics expertise from outside agencies (GSA Rates) and 2) savings as compared to the use of external consultants for Lean training and certification.

#1 - The average VA-CASE daily rate for Industrial Engineering and Informatics Services from FY09-12 (*FY12 estimated) was $790.85. GSA rates for equivalent support (Sr. Engineering and Sr. Scientist Support for this same period) are approximately $1500/day. Through the 10,000 days of support provided to date, this results in an estimated cost savings as compared to external services of $7M.

VA-CASE Cost for Services compare to GSA Rates				
	FY09/FY10	FY11	FY12*	**Totals**
	$ Amount	$ Amount	$ Amount	**$ Amount**
Salaries - Direct Hires	$ 1,000,000	$ 2,550,000	$ 4,120,000	**$ 7,670,000**
Salaries - Contracts/IPAs	$ 900,000	$ 1,400,000	$ 3,000,000	**$ 5,300,000**
# of days of Engineering/Informatics Support Provided	2500	5000	8900	16400
VA-CASE Engineering/Informatics Cost/Day	$760.00	$790.00	$800.00	$790.85
GSA Rates - Sr. Engineering Support ($180/hour)				$1,440.00
GSA Rates - Sr. Scientist (PhD) Support ($210/hour)				$1,680.00
GSA Rates for 10,000 days of Engineering/ Informatics Support ($1500/day)				$15,000,000
VA-CASE Rates for 10,000 days of Engineering/Informatics Support ($790.85/day)				$7,908,537
FY09-Present Savings for VA-CASE vs GSA Industrial Engineering/Informatics Support				**$7,091,463**

#2 – Through comparison of published external consultant rates for Lean Training to VA-CASE cost per participant, we can determine an estimated cost savings of $5.7M for Lean training to date.

Lean Training/Co-Facilitation	**FY09-present**		**Participant Costs**	
	# of Sessions	**# of Trainees/ Participants**	**VA-CASE**	**External Consultants (Published Rates*)**
Lean Yellow Belt	67	2680	$ 212.50	$ 1,195.00
Lean Green Belt	31	1240	$ 212.50	$ 1,195.00
Lean Black Belt	30	600	$ 350.00	$ 1,995.00
Senior Executive Experience (SEE)	11	440	$ 212.50	$ 1,295.00
Rapid Process Improvement Workshops (RPIWs)	14	280	$ 500.00	$ 1,250.00
Leading Organizational Improvement Workshops (LOI)	10	400	$ 875.00	$ 1,295.00
Return on Investment Analysis (ROI)	2	80	$ 212.50	$ 795.00
Total Lean Training/Co-Facilitation FY09-Present	**165**	**5720**	**$ 1,643,500**	**$ 7,382,800**
Estimated Cost Savings (VA-CASE vs External Lean Training)				**$ 5,739,300**
*All rates based on American Society for Quality off-site training programs, except for RPIW co-facilitation, based on Simplar on-site consulting rates				

The resultant total VA-CASE cost savings to VHA from FY09-present can be estimated at $12.7M.

XII. FY12+ Plans

Moving forward from FY12+, we will continue Center efforts to migrate from the 'start-up' phase of development to create a sustained, customer-oriented VERC within VHA.

Within each of our program areas, we will continue to leverage existing partnerships to build a balanced portfolio of projects (i.e. Project Pipeline) that will continue to support rapid project development cycles - from proof-of-concept to national dissemination – in 12-18 months. Additionally, we will continue to create and facilitate the development of a culture that will foster innovation amongst our staff and faculty, yet insure commitments to customers are fulfilled and projects are supported through to national dissemination.

Leading into FY12, we have added over $3M of non-core funded projects, which will allow us to expand our staffing further, to bring the total amount of funding to nearly $8.5M. This funding will be utilized to facilitate the expansion of existing programs and additional administrative and technical capacity.

FY12 Specific Goals:

AIM1: Education and Training The VE-TAP Education and Training Programs are growing at a rapid rate. In FY12, we will develop an internal VERC Lean Certification Program, fulfill commitments to the existing Educational and Professions Development Projects and expand current training programs by 50%. We will also begin to explore the potential of virtual training for existing face to face programs.

AIM2: Building the Support Infrastructure We plan to add an additional 5 FTEE of Industrial Engineering, administrative and informatics support with at least 2 technical positions filled from graduating students from our IE internship programs. To fill the administrative functions, we are actively recruiting from the OEF/OIF returning veterans (as of this publication, we have successfully hired 3 OEF/OIF veterans).

AIM3: Rapid Implementation Strategies VA-CASE will continue to support and provide mentoring and training for Rapid Implementation strategies across VHA facilities/VISNs. Our goal is to increase support for RPIW events by at least 25% this year. Additionally, we will continue to expand the translation and application of innovative rapid development, deployment and implementation strategies, such as Agile Program Development and Continuous Engineering Development (Rapid Prototyping).

AIM4: Support Innovative Models of Care Delivery VA-CASE will continue to support and develop innovative models of care delivery including team based care, telehealth, secure messaging, and specialty integration with primary and specialty care through our partnerships with the National Office of Specialty Care and National Surgery Office as part of their national collaboratives. Through the VA-IDEA program, we will continue to develop, train, and distribute innovative forms of documentation including health factors and reminder dialogs.

AIM5: Translate Research into Practice We will continue to support and develop HSRD/QUERI/VERC partnerships through fulfilling commitment and provide appropriate support for the INSPIRE, RE-INSPIRE and GRACE grants. We will continue to support dissemination of VERC and VA-CASE work through publications and presentations in non-VA forums.

AIM6: Pursue External Funding We will continue to pursue external funding mechanisms and to increase the amount of funding generated through external (non-VA) agencies. Our goal is to increase the amount of external funding by at least 25% in FY12.

Appendix A: Relevant VA-CASE Publications and Presentations

Refereed Journal Publications

Alaeddini A, Yang, K, Yu, S (2010) "A probabilistic model for predicting the rate of no-show in hospital appointments", *Healthcare Management Science*, 2010, 14(2), pp 146-157

Alaeddini, A., Reddy C Yang, K., (2011) "A Hybrid Model for Predicting Disturbances in Healthcare Appointments", To be submitted to: *Transactions on Intelligent Systems and Technology*, 2011, Accepted with revisions

Alaeddini, A., Reddy C Yang, K., (2011) "An Integrated Prediction and Optimization Model for Effective Appointment Scheduling in the Presence of No Show" Under Review : *IIE Transactions in Healthcare* 2011

Alaeddini, A., Yang, K., Reddy C (2012) "A Probabilistic Model for Predicting Disturbances in Hospital Appointment Scheduling", To be submitted to: *Management Science*, 2012

Bidassie, B., McGlothlin, J.D., Barany, J.W., McCabe, G.P., Duffy, V.G., Witz, S.M. (in review). *Development of a Predictive Model for Low Back Musculoskeletal Disorders based on Occupational and Lifestyle Risk Factors*. Manuscript submitted for review.

Bidassie, B., McGlothlin, J.D., Goh, A., Feyen, R., Barany, J.W, (2010). *Limited Economic Evaluation to Assess the Effectiveness of a University-Wide Office Ergonomics Program*. Applied Ergonomics. 41(3), 417-427.

Bidassie, B., McGlothlin, J.D., Mena, I., Duffy, V., Barany, J.W., (2010). *Evaluation of Lifestyle Risk Factors and Job Status Associated with Back Injuries among Employees at a Mid-Western University*. Applied Ergonomics 41(1), 106-114.

Ma, X.Y., Yang, K., Brayley, K., (2011) "RTLS-based ubiquitous healthcare system design and implementation". *White Paper RFID Journal,* .August, 2011

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "Transforming the Sterile Processing Department through RFID-based healthcare Workflow Technologies", To be submitted to *International Journal of Medical Informatics.2012*

Ma, X.Y., Yang, K., (2012) "Design of a medical rule engine for healthcare workflow management in Sterile Processing Department", To be submitted to *International Journal of Medical Informatics.*

Murat, A., and Nepal, B. "Effect of Scheduling Policies on Operating Room Overtime Performance", Int. J. Services and Operations Management, Vol. 7, No. 2, 2010, pp. 231-251

Wang, J., Murat, E.A., Neemuchwala, H., and Yang, K. (2011). Proactive Management of Operating Room by Using Simulation. Under Review: *Health Services Research* , 2011

Refereed Conference Proceedings

INFORMS Pierskalla Award Finalist: Adel Alaeddini, Kai Yang, Susan Q. Yu, "A Probabilistic Model for Predicting the Rate of No-Show in Hospital Appointments", *2010 INFORMS Annual Meeting*, Nov 7-10, 2010, Austin, Texas

Abdella, G., Yang, K., Ellis, D., Alamri(2010), A., "Mistake-Proofing in Inpatient Discharging Process", IERC 2010 Annual Conference June 5-9, 2010, Cancun, Mexico

Alaeddini, A, Kai Yang (2010), "A Probabilistic Model for Decreasing the Rate of No-Show in Hospital Appointments", IERC 2010 Annual Conference June 5-9, 2010, Cancun, Mexico

Alaeddini, A., Yang, K.(2011), "An Integrated Prediction and Optimization Model for Effective Appointment Scheduling in the Presence of No Shows", INFORMS 2011, Charlotte, NC
Reddy,C., Alaeddini, Yang, K., Reddy, C., (2011) " A probabilistic Model for Predicting Readmissions in Medical Centers", INFORMS 2011, Charlotte, NC

Alaeddini, A., Yang, K., Reddy, C., (2011), "Stochastic Optimization Model for for Patient Scheduling under Different Arrival Disturbances", IERC (2011), Reno, NV

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "RFID-based healthcare workflow management in Sterile Processing Department", Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida.

Russ AL, Baker D, Fahner WJ, Milligan BS, Cox L, Hagg HK, Saleem JJ. "A Rapid Usability Evaluation (RUE) Method for Health Information Technology", *Proceedings of the American Medical Informatics Association (AMIA) Symposium*, Washington, DC, 702-6, Nov 2010.

Wang, J. Yu, S., Kai Yang (2010), "Operating Room Utilization Study", IERC 2010 Annual Conference June 5-9, 2010, Cancun, Mexico

Presentations

Bickel, David, Fahner, Jeff, Jacobitz, Russell (August 11, 2010) Route 66: Traveling Down Function Findings

Bidassie, B., McGlothlin, J., Barany, J., McCabe, G., Duffy, V., Witz, S., *Ergonomics and Life Style Choices Associated with Low Back Injuries Among University Residence Hall Employees.* Student Poster Presentation: 2010 American Industrial Hygiene Conference & Expo (AIHce) in Denver, May 26, 2010.

Bidassie, B., *Investigation of the Synergy between Healthy Workplaces and Healthy Lifestyles Risk Factors to Predict Low Back Injury*: Healthy Purdue Research Symposium, Purdue Memorial Union, February, 3rd, 2010.

Bidassie, B., McGlothlin, J., Goh, A., Feyen, R.G., Barany, J. W. *Limited Economic Evaluation to Assess the Effectiveness of a University-Wide Office Ergonomics Program.* Student Poster Presentation: American Industrial Hygiene Exposition (AIHE) Conference in Chicago, February, 18, 2009.

Bidassie, B., McGlothlin, J., Huetteman, J. *Development of a Work-Life Program to Reduce Back Injuries among University Employees.* Student Podium Presentation: 2008 American Industrial Hygiene Conference & Expo (AIHce) in Minneapolis, June 5, 2008.

Bidassie, B., McGlothlin, J., Huetteman, J. *Healthy Workplaces and Lifestyles: Sustaining a Strong Musculoskeletal System at Work, Home, and Play.* Student Poster Presentation: American Industrial Hygiene Exposition (AIHE) Conference in Chicago, February, 20, 2008.

Corum, C., Eskau, D. (2011, September). Mapping - VATAMMCS. Breakout session presented at the 2011 VHA Improvement Forum, Las Vegas, NV.

Fahner, Jeff, Jacobitz, Russell (2010, October) Introduction to VHA IC

Fahner, Jeff, Jacobitz, Russell (2011, January) Mammogram Orders/Fee Basis Meet Directive

Jacobitz, Russell, Rozelle, Susan (April, 27, 2011) Caregiver Support Phase 2 Training

Fahner, Jeff, Jacobitz, Russell (June 29, 2011) **P**XRM*2*16 CPRS Order Checks using Clinical Reminder Definitions or Terms

Fahner, Jeff, Jacobitz, Russell (July 6, 2011) **P**XRM*2*16 CPRS Order Checks using Clinical Reminder Definitions or Terms

Fahner, Jeff, Jacobitz, Russell (2011, July) Greenfield Innovation Team

Fahner, Jeff, Jacobitz, Russell (January 10, 2012) VHA OAI Patient Safety training on Clinical Reminder

Ma, X.Y., Yang, K., (2011) "RFID-based Design of Smart Inventory for Medical Supply. Institute for Operations Research and the Management Sciences (INFORMS 2011), Charlotte, NC.

Ma, X.Y., Yang, K., (2011) "RTLS-based ubiquitous healthcare system design and implementation", Institute for Operations Research and the Management Sciences (INFORMS 2011), Charlotte, NC.

Ma, X.Y., Yang, K., (2011) "RTLS-based ubiquitous management of medical supply". Industrial Engineering Research Conference (IERC), Reno, Nevada.

Ma, X.Y., Murat, A., Yang, K., (2011) "Allocation of Perishable Medical Inventory with Return and Transshipment Policy". Industrial Engineering Research Conference (IERC), Reno, Nevada.

Ma, X.Y., Yang, K., Reeves, P., Yu, S., (2012) "Real-time Operation Room Workflow Management. Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida, May 19-23, 2012

Ma, X., Alamri, A., Abdella, G., Murat, A., and Yang, K., "Allocation of Perishable Medical Inventory with Returns and Transshipments", IIE Annual Conference and Expo (IERC), Reno, Nevada, May 21-25, 2011.

Miech, E., Murman, E. Woodward-Hagg, H. (2010, May). Innovative strategies for assessment. Half-day workshop presented at the Annual Meeting of the Lean Educator Conference, Daytona Beach, FL.

Murat, Alper . "Application of Manufacturing Models to Healthcare Industry- Operating Rooms", Premier Breakthroughs Conference, Anaheim, California June 2009.

Murat, Alper. "Operational Simulation of Operating Rooms", *Keynote Speaker*, Michigan Simulation User Group-2011 Annual Conference, University of Michigan, Ann Arbor, MI Oct 19,2011

Rennels, Ken. "Healthcare, Life Sciences and Engineering Technology". Conference for Industry and Education Collaboration. Palm Springs, CA. February 5, 2010

Wang, J, Murat, A., "Multi-facility OR Case Scheduling", INFORMS Annual Conference, Charlotte, NC, November 13-16, 2011.

Wang, J, Murat, A., and Yang K., “Sensitivity Analysis of Factors Impacting Operating Room Utilization by Simulation”, IIE Annual Conference and Expo (IERC), Reno, Nevada, May 21-25, 2011.

Wang, J, Zhao, Y., Murat, A., and Yang K., “Multi-facility OR Case Scheduling”, IIE Annual Conference and Expo (IERC), Reno, Nevada, May 21-25, 2011.

Wang, J, Murat, A., “Multi-facility OR Case Scheduling”, IIE SHS National Conference, Orlando, FL, 17-19 February, 2011.

Wang, J., Yang, K., and Yu, S. (2010, May). Operating Room Utilization Study. Presented at Industrial Engineering Research Conference, Cancun, Mexico.

Wang, J., Yang, K., and Yu, S. (2010, November). Operating Room Utilization Study. Presented at INFORMS Annual Meeting, Austen, TX.

Wang, J., Yang, K., and Yu, S. (2011, February). Operating Room Labor Performance Measure. Presented at Society for Health Systems Conference, Orlando, FL.

Wang, J., Murat, E.A., Yang, K., and Zhao, Y. (2011, February). Multi-facility Healthcare System Surgical Case Scheduling. Presented at Society for Health Systems Conference, Orlando, FL.

Wang, J., Yang, K., and Yu, S. (2011, February). Operating Room Utilization Study. Presented at Society for Health Systems Conference, Orlando, FL.

Wang, J., Murat, E.A., Yang, K., and Zhao, Y. (2011, May). Multi-facility Healthcare System Surgical Case Scheduling. Presented at Industrial Engineering Research Conference, Reno, NV.

Wang, J., Murat, E.A., and Yang, K. (2011, May). Sensitivity Analysis of Some Factors Impacting Operating Room Utilization by Simulation. Presented at Industrial Engineering Research Conference, Reno, NV.

Wang, J., Murat, A, Neemuchwala, H.K., and Yang, K., "Proactive Management of Operating Room Resources Through Operational Simulation", Health Services Research, (Submitted December 2011).

Yang, K., Yu, S. (2011) “Industrial Engineering for Healthcare Industry”, Invited Seminar Speaker, Department of Industrial and Operations Engineering, University of Michigan, Ann Arbor, MI , Oct 3, 2011

Yang, Kai. “Industrial Engineering for Healthcare Industry”, Invited Seminar Speaker, Department of Industrial and System Engineering, University of Washington, Seattle, WA , Feb 2, 2010

Yang, Kai. “The Role of Industrial Engineering in Healthcare Industry”, Invited Seminar Speaker, Department of Industrial Engineering and Management Science, McCormick School of Engineering, Northwestern University, April 13, Evanston, Il., 2010

Yang, Kai. “Industrial Engineering for Healthcare Industry”, Invited Seminar Speaker, Department of Industrial and System Engineering, Auburn University, Auburn, Alabama, Nov 3, 2010

Yu, S., Yang, K., Ravi,N., Reeves, P, (2012) “Statistical Model based Patient Panel Pool Determination for Patient Centered Medical Homes” Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida., May 19-23, 2012

Yu. S.(2012).Lesson learned from Patient Aligned Care Team Implementation. Present at WCBF's lean Six Sigma and Process Improvement in Healthcare, May 15-18, New Orleans, LA.

Zhao, Y., Yang, K., (2012) “.specialty care clinic scheduling in multiple-service-site health care system”, . Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida. May 19-23, 2012

Manuscripts in Preparation

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Appendix B: Faculty Listing and Bios

Directors/Staff Support

Heather Woodward-Hagg, MS is currently the Co-Director of the VA Center for Applied Systems Engineering (VA-CASE). Ms. Woodward-Hagg is also the Chief of the Systems Redesign Service at the Roudebush VA Medical Center in Indianapolis, IN. Prior to joining VA, Heather was a Research Scientist at the VA Center for Implementing Evidence Based Practice (VA-CIEBP) in Indianapolis as well as the director of Performance Improvement Programs for the Regenstrief Center for Healthcare Engineering (RCHE). Ms. Hagg has directed a statewide collaborative of Purdue School of Engineering and Technology faculty partnering with Indiana hospital and healthcare providers in translation of quality engineering methodologies. Ms. Hagg holds B.S. degrees in Ceramic Engineering and Mechanical Engineering from University of Missouri-Rolla and a MS degree in Materials Science and Engineering from Worcester Polytechnic Institute. Prior to her work in healthcare, Ms. Hagg spent nine years at Intel as a process and quality engineer within semiconductor manufacturing.

Mary Sherrill, MS is a Health Systems Specialist and has served as Systems Redesign (formerly Advanced Clinic Assess) Point of Contact with program coordination responsibility since 2000. Ms. Sherrill has 37 years of progressively responsible managerial experience in the community and the VA at the facility, region, and network levels where staff education/development, performance/systems improvement, and organizational redesign of administrative and service delivery systems were the focus of her efforts. She has held positions to include Region Audit Coordinator/OIG Liaison and VA Human Resources (HR) Service Chief. Ms. Sherrill has a Bachelor's degree in Business & Financial Management and a Master's Degree in Pastoral Arts and Counseling.

Pamela A. Pau, PMP is currently the VISN 11 Veterans Engineering Resource Center (VERC) Business Manager. Ms. Pau works at the John D. Dingell VA Medical Center in Detroit, MI. Prior to joining the VA, Pam was a Global Program Manager for Electronic Data Systems (EDS) working at the General Motors World Headquarters in Detroit, MI supporting GMAC. As an experienced Program Manager with Fortune 500 and international experience, Pam has proved success in Information Technology program management, sales, marketing, qualitative and quantitative analysis and reporting, contracting and financial reporting, vendor management, Human Resources, customer service and multicultural team building. Pam's global team was comprised of system engineers, database administrators, and project management personnel, located in Germany, South Africa, Argentina, Brazil, Canada, and the U.S. Pam was recognized with General Motors CIO Award for Excellence and she has her Project Management (PMP) certificate.

Julie Morgan completed her Associates degree at Indiana University and is currently the Administrative Assistant for VA-CASE. Julie has previous experience as the administrative assistant for the plant

manager at DaimlerChrylser and also served as an administrative assistant for the 432nd Reconnaissance Wing Group Commander at Misawa Air Base, Japan and the 52nd Fighter Wing Commander at Beale AFB, California where she managed daily office operations and supervised and trained administrative staff of subordinate units. Julie's military awards include the Air Force Achievement Medal, Meritorious Service Medal, Airman and NCO of the Quarter, and she was a distinguished graduate from both Airman Leadership Academy and the Non-Commissioned Officer Academy. In her current position she is currently focusing on scheduling and coordination of Lean training.

Candace Kingma, J.D., is the Public Affairs Specialist for VA-CASE. She previously served as the Public Affairs Specialist for the Center of Excellence on Implementing Evidence-Based Practice, Health Services Research and Development Service in Indianapolis. Prior to her service with VA, she was the Director of Marketing for RCI's military leisure travel division.

Her duties with VA-CASE include producing and implementing internal and external communications,; designing and developing communications initiatives, producing marketing materials and planning for communication dissemination. She prepares and disseminates news releases, feature articles, and accompanying photographs to the media. She will ensure marketing and communications efforts reach the widest possible audience through the internet, email, written communications, journals, and other media outlets.

TaTanisha L. Williams-Thompson works as a student trainee in the VERC as an administrative assistant to Pamela Pau. She also assists the Cancer Care teams with their projects and maintains reports on their SharePoint. Ms. Williams-Thompson is currently pursuing two degrees from Wayne State University - Business Management and Information Systems, as well as, Marketing, Logistics and Supply Chain Management. She has spent the majority of her professional career in the private sector in the areas of healthcare management, project management and account management. Most of her free time is spent volunteering in the Detroit area shelters, soup kitchens and youth organizations. She volunteers her time and resources at the John D Dingell VA on Saturdays in the Community Living Center, where she uses her passion for food to teach veterans how to cook healthy desserts and healthy home favorites. She is also very active in her church where she teaches Sunday school.

Tom Kerr, M.P.H., is a Health System Specialist in the Office of the Chief of Staff and has served in a number of planning and operations positions during his 20-year career at VA Ann Arbor. Mr. Kerr received his MPH degree from the University of Michigan School of Public Health.

Tom is currently serving as one of the lead individuals for the implementation of an institution-wide Lean program at VA Ann Arbor. Mr. Kerr has completed a healthcare Lean certification course through the University of Michigan as well as Lean strategy deployment training provided through the Lean Enterprise Institute. Mr. Kerr is also coordinating a systems redesign project in collaboration with the University of Michigan College of Engineering to improve operating room scheduling and flow at VA Ann Arbor.

Susan (Qian) Yu, MS, PhDc is the chief of systems redesign section at the John D. Dingell VA Medical Center. She is a certified Six Sigma Master Black Belt and has implemented many lean and Six Sigma projects in the past ten years. Susan has received M.S. degrees in both Computer Application and Quality Engineering and is currently a doctoral candidate in Industrial Engineering at Wayne State University.

Purchased Care Program

Amy Vannatter-Dorr, LMSW, is a Health Systems Specialist and currently serves as the VA-CASE Associate Director for Purchased Care Program. She earned her Master's in Social Work from Michigan State University and worked in health care in the private sector before starting with the VA in 2003. Amy has worked for the VISN 11 Network Office since June 2010 and joined the VA-CASE team in July 2011. She has extensive experience in a variety of health care settings as a clinical social worker, program manager, and in program development. Amy recently completed the VHA Graduate Health Administration Training Program in Health Systems Management through which she received first place in the Individual Presentation Competition for her work on the Non-VA Care Coordination Project.

Thomas F. Brady Ph.D. holds a Ph.D. in Industrial Engineering from Purdue University and is Department Chair of Engineering Technology at Purdue University North Central. His Ph.D. work focused on the integration of computer simulation and optimization technologies. Dr. Brady is an active consultant in the areas of computer simulation, strategy development, and process analysis and improvement.

He has developed computer simulation solutions for Caterpillar, the Department of Energy, The United States Air Force, Boeing, General Electric, Ford, Statoil, US Steel, AMTRAK, Bethlehem Steel, Atlas Steel, Sullair, the Sisters of Saint Francis Health System, Fagen Pharmacy, and Biotta Juice. Prior to working at Purdue University North Central, Dr. Brady worked at Pritsker Corporation for six years, developing simulation solutions for Fortune 100 clients worldwide.

Edward Gensert, BSIE is an Industrial Engineer for the Purchased Care/VISN 11 Project Team. In 2010, Edward received his Bachelor's in Industrial Engineering with a minor in Business Administration from Bradley University in Peoria, IL. While in school, Edward was an active member and president of Alpha Pi Mu (Industrial Engineering Honor Society). He worked as a student trainee for VA-CASE from June-December 2010. In January 2011, Edward joined VA-CASE in Indianapolis, IN to work on the FBCS Optimization Project. Edward's areas of focus are Discrete-Event Simulation, Process Improvement/Standardization, Time Studies, and Statistical Data Analysis.

Chris Heathcote, **BSIE** holds a Bachelor of Science degree in Industrial Engineering and a minor in management from Purdue University. Graduating in 2004, Chris worked as an industrial/process engineering consultant for four years in the pharmaceutical and automotive industries. Typical projects included updating job designs and standard operating procedures to optimize labor and equipment utilization. After consulting, Chris worked as an inventory analysis in pharmaceuticals. He developed a

database to optimize inventories of 180 pharmacies across the United States by generating automatic replenishment orders based on forecasting. Chris works on the VA-CASE Purchased Care/VISN 11 Project Team and is based at the Detroit VA. His primary focus is on the FBCS Optimization Project.

Arun Deepak Sampath Kumar, **MSIE** has a Master's in Industrial & Systems Engineering from Wayne State University and a Bachelor's in Mechanical Engineering from Anna University in Chennai, India. He worked as a Lean Production Engineer at the Acetach Pct., Ltd. in Coimbatore, India through which he gained experience in logistics and Lean concepts. Arun completed an internship in 2011 as a Process Improvement Engineer at Henry Ford Health Systems in the Department of Pathology. He joined the VA-Case Purchased Care/VISN 11 Project Team in December 2011 and works in the VISN 11 office in Ann Arbor, MI. Arun provides engineering assistance on the FY12 VISN 11 Process Improvement Initiatives in the areas of commodities standardization, patient flow, homelessness, and patient safety ("No Harm"). Arun is Six Sigma Green Belt Certified.

Eric Lammers, BSIE, is an Industrial Engineer for the Purchased Care/VISN 11 Project Team. Since joining VA-CASE in 2010, Eric has worked on a variety of projects including the FBCS Optimization Project, Non-VA Care Coordination Project, and various simulation and capacity planning projects. Eric specializes in Discrete-Event Simulation, Statistical Data Analysis, Process Improvement, and Process Standardization. Prior to joining VA-CASE, Eric spent 4 years at Production Modeling Corporation (PMC), a Dearborn, Michigan based Industrial Engineering consulting company, where he acquired diverse consulting experience by supporting and managing various Industrial Engineering projects across multiple industries in the private sector (including manufacturing, health care, insurance, pharmaceutical, retail, and service). Eric enjoys providing technical leadership and training to others, as well as publishing and presenting his team's work at national conferences. He received a Bachelor of Science degree in Industrial & Systems Engineering from the University of Michigan in 2006 and obtained Lean Healthcare Black Belt certification from Purdue University in 2011. Eric is based at the Detroit VA.

Marianne Pilat, **MSIE** has a Master's in Engineering Management from Rensselaer Polytechnic University and a Bachelor's in Industrial Engineering from Wayne State University. Marianne worked as an industrial engineer for General Motor's Corporation and obtained experience in Labor, Assembly Process, Cost Estimating and Pre-production Operations. Since joining VA-CASE in 2010, Marianne has worked on a variety of projects including the Second and Third Generation Cancer Care Collaboratives (2010/11), First Generation Stroke Collaborative (2011/12), the Rural Health Performance Improvement Initiative (2011), the Improvement Advisory Academy (2011) as a presenter/mentor, and as a manager for the Lean Education Program (2011). In 2011, Marianne joined the Purchased Care/VISN 11 Project Team as the Systems Redesign Project Lead on four VISN initiatives focused on commodities standardization, patient flow, homelessness, and patient safety ("No Harm"). Marianne is based at the VISN 11 office in Ann Arbor, MI.

Mark P. Van Oyen Ph.D., is presently an Associate Professor of Industrial and Operations Engineering at the University of Michigan, where he recently completed a three year term as the Director of the Engineering Global Leadership Honors Program for the College of Engineering. His core interests focus

on the analysis, design, control, and management of operations systems, with emphasis on healthcare, service operations, and supply chains and how they can be designed for greater performance, flexibility, and resilience.

He was a faculty member of the Northwestern University Sch. of Engineering (1993-2005) and Loyola University of Chicago's Sch. of Bus. Admin. (1999-2005). In industry, he was a researcher with GE Corporate R&D as well as an analysis and simulation engineer with Lear Siegler's Instrument & Avionic Systems Division.

Collaboration Program

Balmatee Bidassie, Ph.D, serves as Veterans Engineering Resource Center (VERC) Patient Aligned Care Team (PACT) Master Co-coordinator and Associate Director for Collaborative Program. Balmatee Bidassie's broad-based experience encompasses computer science, electrical engineering, industrial engineering, academics, statistics, research, project management and operations. Dr. Bidassie's industrial experience at Eaton Corporation allowed her to work with various global functional groups and in various leadership positions. Recently, she was the manager of Global Engineering/IT programs where she formulated Engineering-IT strategies and implemented global product life cycle management applications. She also served as a global Certified LEAN Six Sigma Black Belt responsible for developing, leading, coaching and facilitating Design for Six Sigma (Product Development), Lean Manufacturing, Lean Six Sigma projects as well as mentoring 100+ candidates, including senior executive staff, toward certification. Balmatee Bidassie received her Bachelor of Engineering degree in Electrical Engineering from City University of New York, two Master Degrees from Columbia University of New York: Master of Arts (Statistics), Master of Science (Electrical Engineer with a concentration in Telecommunication) and doctorate from Purdue University (Industrial Engineering).

Jihan Wang is a **Ph.D.** student in the Department of Industrial and Manufacturing Engineering in Wayne State University located in Midtown Detroit, MI. She also received her Bachelor and Master's degree from Wayne State in the same study field. Jihan received her certified Six Sigma Green Belt certificate in 2008 and has been on Dean's Honor Roll since she joined Wayne State. She also received the High Scholastic Average Award for her outstanding academic excellence performance. Her past work experience includes working as an intern in Henry Ford Healthcare System and has been working with Veteran Affairs Medical Center since January 2009. She also once worked for Ford Motor Company as a quality analyst to predict warranty costs for vehicles. Currently at the VA, she is focusing on operating room management by looking at improving surgical suites utilization, cost efficiency and case scheduling.

Barbara S. Boushon, RN, BSN, serves in multiple roles to improve health care. Through Mark Murray and Associates, she currently works with large and small health care organizations across the United States and Canada to improve access to primary and specialty care, medical office flow and efficiency, and hospital flow.

At the Institute for Healthcare Improvement (IHI), she led learning collaboratives with health care organizations and government entities seeking to improve care for patients with chronic conditions such as asthma, depression, and HIV/AIDS disease. She also developed and led IHI's first totally virtual collaborative with the topic of improving access to primary care. Most recently, she directed an initiative to reduce harm from falls on medical-surgical units as part of the safety and reliability work in IHI's Transforming Care at the Bedside initiative, funded by the Robert Wood Johnson Foundation.

Through the National Quality Center (funded through the HIV/AIDS Bureau), she works with state and federal government to improve care for people living with HIV/AIDS disease and serves as faculty for developing quality improvement capacity, leadership potential, and facilitation skills for Ryan White Care Act grantees.

With the Veterans Administration, she is co-director of the national Transitioning Levels of Care Collaborative and the Patient Aligned Care Team Regional Collaboratives.

With Vermont Oxford Network, Barbara facilitated the work of the Infection Topic Group, and most recently will facilitate the POD Homeroom.

Before becoming involved in these quality and process improvement activities, Barbara worked at Dean Health Systems in Madison, Wisconsin in multiple clinical and administrative roles including RN and RN Coordinator of sub-specialties, Director of Patient Care Services, Director of Software Development and Telecommunications, and Services Initiatives Administrator. In this last role, she led initiatives to improve both access to care and customer service throughout the health system. Previous to this, she also worked as an RN for the Red Cross, and as an RN in a Medical Intensive Care Unit.

Sai Shruthi Musunuri, MSBME is currently a part of the Cancer Care Collaborative Second Generation project working with the VISN 11 VERC as an Industrial Engineering coach for the collaborative. Shruthi holds a Master of Science in Biomedical Engineering (2009) and a Bachelors of Science in Computer Engineering (2006) from the Purdue University. Shruthi Musunuri's work skills range from biomedical research, engineering design, process analysis, redesign & development and her career included opportunities from Aalborg University, Denmark, Indiana University Purdue University, Indianapolis, University of New Orleans, Northrop Grumman Ship Systems.

Shaiju Eapen, BSIE, CSSGB, has 3+ years of professional experience in both manufacturing and healthcare. He earned his Bachelor's in Science in Industrial Engineering at Wayne State University and currently pursuing his Master's in Business Administration at Florida Tech University. His healthcare experience includes emergency department and operating room optimization, registered nurse flow, standardization of patient units and also facilitated various lean kaizen projects. Shaiju has been working in VA since September, 2009. He has been involved in various facility projects in Detroit and conducted analysis on primary care scheduling grid, parking structure etc. He is currently involved in Cancer Care Collaborative and PACT Collaborative. In addition to his professional background he is an active member in Institute of Industrial Engineers.

Pranav Radhakrishnan, MSIE is currently an Industrial Engineer at VA-CASE where his experience include serving as an Industrial Engineering coach for the collaborative, supporting various teams by providing engineering support and lean education in a RPIW setting. His prior work experience as an Industrial Engineer in the Systems Redesign Department of the Detroit VA Medical Center include serving as a coach in the Discharge Improvement project with the goal to achieve equal number of discharges though-out the day and even distributed through-out the week. In addition to that project, he was a coach supporting projects involved to reduce response time of pharmacists, Implementation of the Bed Management System, Developing a nursing scheduling and staffing tool and reducing patient falls. Apart from the above mentioned projects he has also worked on various projects in Primary Care, Social Work, Human Resources and Environmental Services and has experience in data analysis, six sigma, process improvement and value stream mapping. Pranav holds a Bachelor of Engineering Degree in Mechatronics Engineering from Anna University and a Master of Science degree in Industrial Engineering from Wayne State University. Pranav's master's thesis was focused on predicting the performance of medication reconciliation done by physicians using CogTool in Human Factors Engineering.

Ashley Turrell is currently a Student Trainee working for the VA Center for Applied Systems Engineering. Ms. Turrell works at the Roudebush VA Medical Center in Indianapolis, IN. She is currently pursuing a bachelor's degree in English with a concentration in Writing and Literacy at Indianapolis University-Purdue University Indianapolis.

Informatics Program

Gail Edwards, R.N. is currently the Associate Director for the Informatics Program. Gail has been involved in many aspects of health care throughout her career as a Registered Nurse. In her current role she is working with the National Cancer Care Collaborative and CBO Fee Referral projects. Gail acts as a liaison between the clinical staff and information technology at the VA Medical Center. Gail has been a champion of electronic medical records and worked in informatics for eleven years in healthcare environments. She is familiar with all aspects of the electronic medical record and modifies or creates documentation templates or orders keeping in mind data retrieval and standardization. Gail has created systems for data management in clinical drug trials.

Gail has a special interest in quality of healthcare using shared best practices optimizing workflow using informatics. Gail earned a BSN from Southern IL University of Edwardsville and ASN from IL Eastern Community College.

Valerie L. Curtis is a Health Systems Specialist with the Informatics Program, VA-CASE. Valerie is very proud to be a contributing partner involved with improving the quality and reliability of healthcare delivery for our nation's heroes. Prior to joining the VA, Valerie was an IT Project Manager for Blue Cross Blue Shield of Arizona (BCBSAZ). Valerie has 16 years of industry experience and a proven track record in IT Project Management, Data Management and Software Quality Management in Healthcare. One of her greatest accomplishments at BCBSAZ was managing the design, development

and deployment of a new claims processing and payment system, which included the migration of three years of historical claims data and a mid-project conversion from SSN's to non-identifiable patient id's. Valerie is a fan of technology and gadgets – demonstrated by the portable wireless network and latest sampling of mobile devices she carries with her everywhere she goes. Valerie was fortunate to attend VA-CASE's Lean Six Sigma Yellow, Green and Black Belt training courses which were so effective, she now employs techniques not only in her work life, but in many facets of everyday life: from facilitating the brainstorming, affinity diagramming and multi-voting the family's vacation plans, to mini-projects on weekends to "5-S" the pantry and mudroom in her family's home. When she's not spending time with her software engineer husband and two little girls, ages 4 and 5, Valerie is working on completing her Project Management certification at Stanford University and is pursuing her Black Belt certification at Purdue University.

Jeff Fahner, RN has been a Clinical Applications Coordinator at the Richard L. Roudebush VAMC in Indianapolis, IN since 2006. He received a Bachelor's in Science in Nursing from Tennessee State University. Before coming to the VA, Jeff worked several years as a pediatric medical-surgical nurse and pediatric intensive care nurse at Vanderbilt Children's Hospital. After moving to Indiana as a travel nurse Jeff spent time as a pediatric burn nurse, a pediatric case manager and a couple of years on an adult medical-surgical floor. Jeff recently graduated from the University of Phoenix with a Masters in Nursing and a Masters in Health Administration.

Before becoming a nurse, Jeff spent 12 years in the U.S. Army and Army National Guard as an Armored Cavalry Officer serving as a tank platoon leader, scout platoon leader and a Cavalry troop executive officer. When Jeff is not working he spends time with his beautiful wife and two children. They enjoy hiking, sports, swimming, traveling and movies.

Jeff is co-founder and co-director of the VA-IDEA.

Russell Jacobitz, RN is originally from Chicago and moved to Gainesville Florida in 1992 to attend the University of Florida, College of Nursing. After receiving his bachelor's degree he came to work at the VA in Gainesville. After working for 7 years as a bedside nurse on the post operative unit, Russell changed roles and joined the Clinical Informatics service. In his 10 years with the service he has held every position including Chief. Currently he is the Clinical Reminders Manager. In addition to this role he also works ¼ of his time for the VERC and specifically the VA-IDEA program. Through this program he travels monthly, teaching his peers in the creation of Clinical Reminders and related tools. Russell's hobbies include going to the park with his 2 boys and running.

Lauren Kelly, BS received her Bachelor's Degree from Indiana University in May of 2011 from the school of Informatics with a cognate in Health Science. Lauren started as a student at the Roudebush VA Medical Center in November 2009 working with BCMA in the Clinical Informatics side of Systems Redesign. In the spring of 2011, she transferred to VA-CASE after having her first child. Lauren is a Program Analyst for the Informatics Program in VA-CASE.

Floyd Douglas Newkirk, MHA is a Health Systems Specialist with the VERC. A native Hoosier, Doug has lived in or near Indianapolis except for his service in the US Air Force. He used his G.I. Bill to complete his Bachelors Degree in Human Relations and Psychology and an Associates Degree in Nursing from the University of Indianapolis. He has a Masters in Health Administration from Indiana University. Post graduate work include services as Assistant Director of Tri-County Mental Health (A Community Mental Health Center), Director for Rehabilitative Services (PT, OT, Speech & Hearing) St Francis Hospital and Health Services, and Service Line Director over Orthopedic/Neurosciences and Behavioral Health Services (Also at St. Francis, Indianapolis/Beech Grove). Doug is currently working part-time as a Health Systems Specialist assigned to a variety of VERC projects.

Jeffrey Peterson, BSN was born and raised in Minnesota and received a BSN from South Dakota State University. Jeff entered the US Army right out of college and served 22 years, retiring in 1994. He completed the Army's Baylor MHA program during that time and received a MS in Health Sciences from Chapman College, Ca. He has been a RN for 37 years all in the Operating Room. He has spent the last 28 years working in management or education roles. On Jan. 1 2012 he became a full time Clinical Applications Coordinator.

Tonya Reznor, BSIT, is the VISN 11 VERC Webmaster. She holds a BSIT in Visual Communications & Multimedia. She specializes in Web and Graphic Design and is an expert in SharePoint architecture, development and implementation for the Indianapolis VAMC. Her most recent successes are the eROC (Electronic Report of Contact), the VISN 11 VERC websites including the Community of Practice/Quality Improvement Toolkit Series.

Kimberly Rollins, BSN, MBA is a Clinical Applications Coordinator for VA CASE. Prior to coming to SD, she was a Clinical Staff Nurse working in the Psychiatry Department, Inpatient unit. She also owned a nursing agency that supplied care giver services for Senior Citizens in the Indianapolis area. Prior to coming to the VA, she worked in the Medicare Fraud and Abuse Department, conducting provider audits for medical necessity of services. She is currently the National CAC consultant on the NVCC (Non VA Care Coordination) project. She provides education and technical support on a national basis for Champion sites around the United States. She holds a Bachelors degree from Indiana Wesleyan, a Bachelors degree from Indiana State University and a Masters in Business from Indiana University. She enjoys spending time with her family and traveling in the Caribbean.

Alissa L. Russ, PhD, is a human factors engineering specialist with the Roudebush VA Health Services Research and Development Center on Implementing Evidence-Based Practice. She also holds appointments with Regenstrief Institute and the Purdue University College of Pharmacy. Dr. Russ completed her graduate work at Purdue University and brings a unique interdisciplinary perspective, with a background in both engineering and clinical sciences, which translates into expertise in the design of tools to enhance medical care. Dr. Russ has received numerous scholarly awards and her interests include: human factors engineering and patient safety; human-computer interaction and usability testing; electronic health records (EHRs) and computerized provider order entry (CPOE); unintended consequences of information technology; understanding the front-line clinical experience via qualitative

research methods; preventing adverse events associated with high-alert medications; anddesigning tools to support healthcare employees, patient care, and patient safety.

Her primary research focuses on computerized medication order checks (e.g., drug-drug interaction alerts) and how their design influences clinical workflow, prescriber decision-making, and medication safety. She also provides basic human factors training to local and national VA informatics leaders as part of the VA-Informatics Development and Education Academy courses. Dr. Russ has several peer-reviewed publications as well as ongoing collaborations with experts in medicine, pharmacy, and VA informatics, and is committed to improving healthcare delivery systems.

Jason J. Saleem, PhD, is a Research Scientist at the VA HSR&D Center on Implementing Evidence-Based Practice, Roudebush VA Medical Center, as well as the Indiana University Center for Health Services & Outcomes Research, Regenstrief Institute. He is also an Assistant Research Professor with the Department of Electrical and Computer Engineering, Indiana University-Purdue University at Indianapolis (IUPUI). Dr. Saleem is a member of the Human Factors and Ergonomics Society (HFES) and American Medical Informatics Association (AMIA).

Dr. Saleem received his Ph.D. from the Department of Industrial and Systems Engineering (ISE) at Virginia Tech in 2003, specializing in human factors. During his graduate training and post-graduate experience, Dr. Saleem has been involved in the study and design of systems in complex domains such as industry, aviation, and healthcare, and has contributed original human factors investigations to the literature in each of these areas. Dr. Saleem's current research involves application of human factors engineering to enhance clinical information systems, including electronic decision support, as well as redesign of healthcare processes for improved safety. Dr. Saleem is a current VA HSR&D Career Development Awardee.

DeRon Walker, MHM received his Master's Degree in Healthcare Management from Indiana Wesleyan University in 2011. After working 1 year as a student trainee in Systems Redesign, he accepted a position as a Program Manager working on the VA-IDEA (Informatics Development Education Academy). On the VA-IDEA team, DeRon helps prepare for courses, along with analyzing data to help improve course material. He also works with the EES Project Manager to obtain accreditation for the VA-IDEA, and also analyzes the cost and budgeting for the program.

Professional Development Program

Deborah A. Griffith, EdD, received her doctorate in Education from Peabody College of Vanderbilt University in 1989. Debi has been an educator in various venues for over 30 years from Elementary School through Senior Citizens, including learners with disabilities. Most recently, Debi was the Director of Curriculum Development for the Department of Psychiatry and OSCE Director for the Simulation Center of Indiana University School of Medicine. Debi's educational experience includes curriculum development, assessment, and research as well as teaching.

Russell Cech, BSysE, MBA is a Lean Sensei Consultant for VA Medical Centers and is based out of the Indianapolis VA Medical Center. His current responsibilities include Leading and Coaching Continuous Improvement (CI) teams, Rapid Process Improvement (RPIW) teams and formal training of Lean Certification Courses. Prior to joining the VA, Mr. Cech applied Lean Six Sigma methods to improve healthcare system Safety, Quality, Effectiveness and Efficiency in both non-profit and for profit hospitals as well as in a primary care facility.

Prior to his work in healthcare, Russell worked as an Engineering Manager, CI Manager and Certified Lean Six Sigma Black Belt in several industries and was a founding member of Honda's Lean Network. He has benchmarked Lean Six Sigma methods internationally and presented Lean Six Sigma / Quality Circle projects at international conferences. Russell introduced and directed an enterprise wide Operational Excellence / Rapid Improvement initiative that was adopted by 55 global facilities and allowed best practices to be shared / leveraged across all facilities.

Russell received a MBA from Purdue University, a BS in Systems Engineering from Wright State University.

Jay Chandra, PhD, is a technical leader, practitioner, and educator in the field of modern Quality Engineering, specializing particularly in Lean and statistical methods for process improvement. Jay has over a period of 16 years, provided extensive training and project guidance to professionals employing *Lean* and *Six Sigma* methods to improve performance of industrial processes and services. He is highly proficient in statistical diagnostic methods and statistical experimentation/modeling employing ANOVA, Hypothesis Testing, Regression, Design of Experiments, Multivariate Analysis, Time Series Analysis, Process Reliability, Survival Analysis, and Monte Carlo Simulation. He has trained 5000 degreed engineers and project leaders worldwide in Six Sigma; facilitated about 25 Lean training sessions in VA hospitals nationwide. As an adjunct faculty in 2010, he received *"Outstanding Faculty Award"* from Wayne State University.

Christine L. Corum, MSIE is an Associate Professor of Mechanical Engineering Technology at Purdue University, where she teaches undergraduate courses related to engineering materials, manufacturing and quality systems. She received a B.S. in Metallurgical Engineering from the University of Missouri-Rolla, now Missouri S&T, and an M.S. in Industrial Engineering from Purdue University in 1995. Her interest areas include healthcare quality systems and engineering technology education. She is a member of ASM International, the American Society for Quality (ASQ), the American Society of Mechanical Engineers (ASME), and the counselor for the Purdue student chapter of ASQ. Christine is currently an active member of ASME's Committee for Engineering Technology Accreditation and a member of ASME's Center for Education Board of Directors.

Debbie Curl-Nagy, MSSW is an independent consultant and trainer with over 15 years of experience developing and providing training, consultation, and technical assistance in evaluation, continuous improvement and action planning to a variety of audiences.

She brings a wealth of experience from her work in state government, education, and non-profit organizations. Most recently, Debbie was employed as Director of Collaboration and Continuous Improvement for a national nonprofit organization focused on improving urban education. In her role as director, Debbie developed curriculum and provided training and technical assistance in the application of an adapted model of Lean Six Sigma to community partnerships. She has worked in government as a state performance auditor and project manager to promote efficiency and effectiveness of public programs; has run programs and taught bachelor's and master's level courses in Social Work; and has worked in the non-profit sector providing crisis intervention and counseling services to children and families. Debbie is a Lean Six Sigma Black Belt; has a Master's degree in Social Work; and has completed 35 hours toward her PhD in Social Work Education. Debbie is currently contracted by Purdue University to provide Lean Process Improvement training and project facilitation to the VA.

Carlos M. Garcia, BSAE MBA has performed as quality and performance improvement expert, project leader, and sensei in various industries including aerospace and consumer electronics, in the US and abroad. Carlos has worked in the VA San Diego Healthcare System, San Diego, California, for over eleven years. There, he contributed to major service quality and performance improvements. Carlos is an expert in systems redesign and sustainability of compliance with regulatory agencies, a healthcare Lean facilitator and coach, and a certified Malcolm Baldrige Examiner. He has been a frequent presenter and coach at ACA-FIX and PACT collaboratives. In 2009, Carlos created the growing national VA Lean Practitioners Network, and serves in the faculty at the University of Phoenix at San Diego. Carlos has a BS in Aerospace Engineering from West Virginia University, an MBA from the University of Phoenix, a Lean Green Belt certificate from the University of Iowa, and holds certificates in leadership and project management from the University of San Diego. Carlos believes strongly in the transformation of VA Healthcare into a modern Lean enterprise.

Keith Henry is a 29 year old 2 time Iraq war veteran who was formerly in the Texas Army National Guard. After high school Keith attended Stephen F. Austin State University where he majored in Criminal Justice. In the fall of 2008 the conclusion was made that perhaps a reevaluation of his life was needed and so proceeded to withdraw from school to do so. He lived in Texas from 1996 until the summer of 2009 when he decided to move back to Indiana to be closer to his family.

Keith is currently attending Ivy Tech where he is majoring in computer networking and security. He will graduate in May of 2012 at which time he is hoping to become a full time employee with the VISN 11 VERC as the Materials and Logistics Coordinator. He also plans to continue to expand on his education to grow and build on his career in the VA.

Shedarra Hill, MBA is a Project Manager for the VA-CASE VERC. Employed at the Indianapolis VAMC since 2009, her roles include coordinating and managing the planning cycle for the Systems Redesign Leading Organizational Improvement Training for senior leadership in all the VISNs. She also serves as program support for the Systems Redesign Service. She attended Kentucky State University where she

received her Bachelor of Arts degree in Business Administration. She also received an MBA at the Indiana Institute of Technology.

Kyle Hultgren, PharmD is currently the Managing Director for the Center for Medication Safety Advancement within the Purdue University College of Pharmacy in Indianapolis, Indiana. He also serves as an Adjunct Assistant Professor of Pharmacy Practice at Purdue where he pursues the development of innovative safe medication use practices as well as engaging methods to educate healthcare practitioners and student pharmacists. Dr. Hultgren is a co-author of a certification program in partnership with Purdue University and the Veterans Health Administration on Lean Healthcare and Systems Redesign that he is currently providing to health systems nationwide. He also serves as Chairman of the Rx-SafeNet Practice Based Research Network Advisory Board for community pharmacy based medication safety research in Indiana and serves on additional boards pertaining to patient and medication safety.

Dr. Hultgren has worked extensively with safe medication use practices in electronic prescribing and was a member of the team from Indiana that received the 2010 Surescripts Safe-Rx Award for e-prescribing excellence. He was also recognized with the Indiana Governor's Award for Tomorrow's Leaders for his pursuits in safety across the state. He lectures extensively on the topics of safe medication use practices and process improvement across the country and internationally.

Dr. Hultgren received his Doctor of Pharmacy from Purdue University College of Pharmacy in West Lafayette, Indiana.

Tyna Hunt attended Ivy tech for 5 ½ years before transferring to Indiana Wesleyan. She is finishing up her associates degree in Business Management and will be starting her bachelor's degree in May of 2012 at Indiana Wesleyan. She is currently a Student Intern for the VERC and has helped complete the NVCC Project. Tyna is currently working on a project for Radiation Oncology.

Lash Mapa, PhD is a Professor in Industrial Engineering Technology at Purdue University Calumet (PUC). His undergraduate and graduate degrees are in Chemical Engineering. He has several years' experience as a Chemical Engineer, Process and Project manager with European and U.S. manufacturing organizations.

Currently, he is involved in the MS Technology program at PUC and has managed over thirty lean six sigma projects with manufacturing, service industry and educational institutions.

He teaches undergraduate courses in Statistical Process Control, Project Management, graduate level Enterprise Quality Management and Quality Systems. He is an ASQ Certified Black Belt.

Edward Miech, EdD, is a core investigator of the HSR&D Center of Excellence on Implementing Evidence-Based Practice (CIEBP) at the Roudebush VA Medical Center in Indianapolis and a faculty member of VA-CASE (the VISN11 VERC). Dr. Miech has a doctorate in education from Harvard and has expertise in program evaluation, assessment, educational theory and mixed methods. In addition to

HSR&D research, Dr. Miech conducts program evaluation for VA Systems Redesign initiatives – including collaboratives – at the local, regional, and national levels.

Mark Miller, BS is a Project Manager for the VISN 11 Veterans Engineering Resource Center (VERC). Prior to joining the VERC Mark returned from his second tour of duty in the Middle East in 2008. He is in his 19th year in the Navy and is currently the Senior Enlisted Leader (SEL) and Chief Boatswains Mate for two companies in Navy Cargo Handling Battalion 7 (NCHB 7).

Mark grew up in southern Kentucky and received his B.S. Degree in 1990 from Murray State University. After graduation he moved to Indianapolis where he worked for the Indianapolis Public School System as a Teacher and a Coordinator and later as a Territory Sales Representative for two major Steel manufacturers. Mark has three children and stays active with their school, sports and scouting activities.

George Ponte is currently a Health Systems Specialist, Lean facilitator for VA CASE . He is a Registered Respiratory Therapist and former Department Chair for Respiratory Care at Springfield College.(1974-1989) In this role he lead curriculum development and educational assessment efforts. George has been involved as a leader in the Advanced Clinic Access, (ACA) initiative since 1999. He has facilitated Station, VISN and National Advanced Clinical Access improvements. He has coordinated and participated in 13 Collaboratives applying Advanced Clinical Access principles in areas ranging from Primary Care, Specialty Care, Mental Health, Inpatient Flow, Sensory and Rehabilitation Services and Cancer Care. He has been a member of the National Systems Redesign Educational Committee since its beginning. He is a facilitator for the Yellow Belt, Green Belt, Black Belt Training and facilitates RPIW's. He is a graduate of the IHI Improvement Advisor Program and Managing Hospital Operations. He was the VISN 1 Systems Redesign Coordinator form 2005 to 2011. He is a member of the National Cancer Care Planning Committee. He co chaired the Committee that developed the Improvement Advisor Academy program and curriculum.

Brian Poynor RN, MSM, LSSBB, a Healthcare Specialist working in the Systems Redesign Services for the VA-VERC, has been with the health system since December 2011. Prior to coming to the VA, he worked for Delnor Hospital Cadence Health System as a Lean Facilitator and Sensei. In this capacity, he led a lean transformation using the ThedaCare Improvement System, and has spent three and half years being trained by Sensei's in the Toyota Production System. His accomplishment includes being certified as an operating room nurse, certificate in Lean Six Sigma form Villanova University, and holds the rank of Lieutenant Coronel in the Army Reserves where he is currently the Emergency Preparedness Liaison Officer for the State of Indiana.

Mr. Poynor's educational background includes a Bachelors of Science in Nursing from Northern Illinois University. He holds a Masters in Management from National Louis University with an emphasis in leadership and organizational development. He has progressed in his military leadership courses, and is a graduate of the Combined Services Staff School. He is presently enrolled in the Command and General Staff School. He holds advanced certifications as an operating room nurse, ACLS certified, and Trauma Nurse Specialist. He is currently a member of The Society of Manufacturing Engineers.

Ken Rennels PE, has undergraduate and graduate degrees in Industrial Engineering from Purdue University and a Master of Science in Business Administration from Indiana University. Ken is a registered Professional Engineer and background includes 11 years of industrial experience in the aerospace industry including six years in management positions. Professor Rennels has been on the Faculty of the Purdue University School of Engineering and Technology at IUPUI for 24 years. Professor Rennels has held administrative appointments at IUPUI including Chair, Department of Mechanical Engineering Technology; Associate Dean for Industry Relations; and Associate Dean for Undergraduate Programs, School of Engineering and Technology. Nationally, Professor Rennels, P.E. is a member of ABET, Inc. Board of Directors and is Treasurer for the Engineering Technology Division of the American Society for Engineering Education. He is a member of American Society for Engineering Education, American Society of Mechanical Engineers, Society of Automotive Engineers and Society of Manufacturing Engineers.

Jennifer L. Sargent, a Master Black Belt in Six Sigma and Lean Management, is currently contracted with the Systems Redesign Service at the Roudebush VA Medical Center in Indianapolis, Indiana, focusing on process improvements in Pulmonary/Respiratory Services under the support of the Chief of Medicine Service. Prior to partnering with the VA, Ms. Sargent was the Business Process and Quality Assurance Director for DWA Healthcare Communications Group (DWAHCG) in Carmel, Indiana. Prior to Ms. Sargent's work in healthcare communications, she spent time in distribution, sales, marketing, operations management , and other Executive Leadership roles incorporating project management and process improvement methodologies and principles leading to both corporate and personal successes.

Susan Scachitti, MBA, CSSBB is a Professor of Industrial Engineering Technology at Purdue University Calumet. Professor Scachitti consults and teaches in traditional areas of Industrial Engineering which include Total Quality Management techniques and organizational change, methods engineering (including Lean methods), facility layout, process improvement, and ergonomics. Prior to working in education, she spent ten years in various engineering and supervisory roles in the telecommunications industry which focused on high volume electronics manufacturing. Her accomplishments include implementation of Total Quality principles including Lean Manufacturing concepts, Demand Flow Technology, self-directed work teams and various other techniques that improve overall process efficiencies within the organization. Also, she held key roles in successfully attaining ISO9001 certification, establishing a benchmark for a self-directed workforce, conducting economic analysis and cost justifications for new manufacturing technologies as well as utilizing various other industrial engineering concepts to reduce cycle times and increase production efficiencies. Since 2004 Professor Scachitti has focused her efforts towards applying Industrial Engineering concepts to improve Healthcare and other non-traditional service environments using Lean and Six Sigma methods. She is a staff member of the Indiana Center of Evidence Based Nursing Practice (EBNP), a collaborating center of the Joanna Briggs Institute. She has participated in system-wide implementation of Lean Six Sigma (LSS) practices within a large Indiana-based healthcare system. She has conducted sponsored research to integrate LSS practices as an implementation approach of EBNP to reduce UTIs, as well as various other research involving simulation modeling, work flow analysis, and process improvement techniques.

Sharon Sidenbender received her M.A. in Sociology with a concentration in Political Sociology from IUPUI in 2005. After four years working in survey research, she accepted a position in Health Services Research and Development (HSR&D) at the Roudebush VA in early 2009. Currently Sharon splits her time between assisting Deborah Griffith with the Improvement Advisor Academy and serving as Program Manager on several HSR&D research studies. She will also be assisting with VA-CASE IRB submissions.

Deanna Suskovich, CSSMBB, is a Master Black Belt in Six Sigma and Lean Management and VA-CASE faculty member. She has extensive experience in application of Lean and Six Sigma within healthcare and is currently providing mentorship and coaching support for facilities participating in the VISN11 Telephone Care Collaborative, the AHRQ funded National MRSA Collaborative as well as VHA ICG sites conducting RPIWs.

Chris Tucker is currently working for the VISN 11 VA Center for Applied Systems Engineering (VA-Case) as a Program Analyst. He has a bachelor's degree in Telecommunications with a minor in Business and Criminal Justice at Indiana University. At this time he is pursuing a Masters degree in Business Administration. Chris is a veteran of Operation Iraqi Freedom and has served 6 years in the Indiana National Guard. Before this job he worked as a Program Coordinator in Volunteer Services.

Jamie Workman Germann MSME, has been implementing lean and six sigma programs in healthcare since 2005. As a tenured professor of Mechanical Engineering Technology at Indiana University Purdue University – Indianapolis (IUPUI), in addition to her teaching role, she worked with faculty/colleagues from multiple disciplines on applied research related to the hospital implementation of lean and six sigma programs. Since leaving the university, she has most recently served as Manager of Performance Improvement for a large acute-care hospital where she was responsible for the roll-out and implementation of a hospital-wide lean program.

Technical Assistance Programs (VE-TAP)

Will Henry Jordan, Capt USN (Ret) is the Program Manager for the Veterans Engineering – Technology Assistance Program (VE-TAP). He manages three technology program lines with numerous projects involving Reusable Medical Equipment, Operational Systems Engineering Services, and Strategic Technology Projects of interest to the VA. Will is involved in all aspects of launching and supporting VERC initiatives. He represents the VERC in national, VISN, and local conferences and meetings. He joined the VA team in November, 2009.

Will is a Navy Veteran, with over 35 years of experience in program development, operational systems integration, and applied engineering. Prior to joining the VA, Will was the Vice-President of Operations, Senior Analyst, and Technology Security Officer for Simulex, Inc.; a software research, design, systems

integration, and services company located in the Purdue University Research Park in West Lafayette, IN. His Navy experience includes tours of duty as the Commanding Officer of two nuclear powered fast attack submarines and a shore-based naval education facility. Additionally, he was the Inspector General for Naval Region Midwest and Naval Education Training Command; the Assistant Chief of Staff, Pacific Submarine Force; Director of Intelligence and Director of Special Operations in the Pacific and Indian Ocean theaters of operation; and the Professor of Naval Science at Purdue University. Mr. Jordan has a Bachelor of Science in Physics from the University of Missouri – Columbia, a Master of Science with Distinction in Systems Technology from the Naval Post Graduate School, and is certified as a Naval Nuclear Propulsion Engineer.

Jeffrey Bailey is currently a Student Intern working with VA Center for Applied Systems Engineering (VA-CASE). He has been involved with the VA-CASE since October 2010. Prior to joining the VA, Jeff was a Materials Manager for a manufacturing company in Indianapolis before deciding to return to school to obtain my degree in Computer Information and Technology. Jeff is currently working with the MakeBuy team developing the web applications and recently began working with the iOS team to develop IPhone/IPad Apps. His anticipated Graduation from Purdue School of Engineering and Technology is this May 2012.

Isa Bar-On, PhD is Professor of Mechanical Engineering at Worcester Polytechnic Institute. Professor Bar-On received her B.S. degree in physics and mathematics and M.S. and Ph.D. degrees in materials science and engineering all from the Hebrew University in Jerusalem, Israel. She joined WPI in 1982. She is one of the founding members of the Healthcare Delivery Institute (HDI) at WPI, and served as its director during 2011/2011. She spent sabbatical years at NASA Glenn research center as an NRC Fellow, at MIT, and at the Technion, Israel Institute of Technology as a Lady Davis Fellow. In the past her research included studies of mechanical properties of materials in support of reliability based design of ceramic components. Professor Bar-On's research interests include understanding dynamics of change and quality and cost aspects of manufacturing and healthcare systems in support of design and strategic decision making. Currently, she is working on a project exploring the effects of electronic health record systems on care delivery processes, funded by the National Science Foundation. She has published in the *Journal of the American Ceramic Society*, the *Journal of Power Sources*, the *Journal of Testing and Evaluation* and others. She is a member of the System Dynamics Society, the American Ceramic Society, and the Scientific Research Society Sigma Xi.

Ratna Babu Chinnam Ph.D. is a Research Professor for the VA Center for Applied Systems Engineering (VA-CASE). He received his B.S. degree in Mechanical Engineering from Mangalore University (India) in 1988 and the M.S. and Ph.D. degrees in Industrial Engineering from Texas Tech University (U.S.A.) in 1990 and 1994, respectively. He is also currently an Associate Professor in the Industrial & Manufacturing Engineering Department at Wayne State University. Prior to that, he was an Assistant Professor with the Industrial & Manufacturing Engineering Department at North Dakota State University from fall of 1994 to summer of 2000.

Darin Ellis, Ph.D., serves as Associate Dean of Academic Affairs at the College of Engineering and has extensive experience in the field of human factors and ergonomics, specializing in reducing human error in human-computer interaction. Dr. Ellis has supervised academic projects in hospital settings, consulted on clinical process improvement teams at health centers and with Fortune 100 medical equipment vendors. His experience includes human factors engineering and human-robot interaction including application of augmented reality to robotic interfaces, user-centered design and evaluation of robot controls and displays operator mental workload assessment and operator-in-the-loop system performance measurement. Applications of this work include robotic assisted surgery and automated surgical skills assessment.

Dr. Ellis is also a member of the WSU Systems Engineering initiative's leadership team, who successfully gained WSU consortium member status in the Department of Defense-funded Systems Engineering Research Center, the first University Affiliated Research Center (UARC) in the United States to focus on Systems Engineering Research.

Kristen Hassmiller Lich, MHSA, Ph.D. Dr. Lich is an Assistant Professor in the Department of Health Policy and Management at the University of North Carolina at Chapel Hill. She received her Master in Health Services Administration and PhD in Health Services Organization and Policy from the University of Michigan, School of Public Health. Dr. Lich specializes in the application of systems thinking, operations research and systems science modeling techniques to health policy and management decision making. She has worked most extensively in tobacco control and infectious disease, but has also begun to apply these tools in other contexts. In ongoing work, she is refining a quantitative multi-level simulation model to support decision-making about how to allocate limited resources to translate evidence into real-world practice around stroke care in the Veterans Health Administration, working on the research side with the Stroke QUERI as well as on the operations side with VA-CASE. She is also applying similar methods to improve both crisis service systems for individuals living with severe mental illness as well as colorectal cancer screening programs serving vulnerable populations in North Carolina. Dr. Lich's research passion is to advance the way we use models (both quantitative and qualitative) and local data to improve policy-decision making, and to engage system stakeholders in the process. She has been invited to talk about the use of models to inform policy and the dissemination and implementation of evidence-informed practice in a variety of settings, including the Centers for Disease Control and Prevention, the National Institutes of Health, and numerous meetings and workshops. She will be co-leading the System Dynamics track at the NIH-sponsored Institute for Systems Science and Health during the summer of 2012.

John Iversen, AS is the Operations Coordinator for the VE-TAP program. John specializes in logistical planning, operational organization, and process standardization. He is currently working in the VE-TAP program in standardizing and tracking of administrative and operational processes. Prior to joining the VA in December 2010, John spent 8 years as a Forward Reconnaissance Specialist assigned to the 10th US Calvary, United States Army, where he acquired many diverse skills to include supporting, managing, educating, and implementing systems and methodologies. A combat veteran, he received an Honorable

Discharge as a Non Commissioned Officer in 2007. He received his Associates degree in Applied Systems Management from the Wyoming Technical Institute in 2008.

Kyoung-Yun Kim, Ph.D., is an associate professor in the Department of Industrial and Systems Engineering at Wayne State University, where he directs the Computational Intelligence and Design Informatics (CInDI) Laboratory and the Product Development and System Engineering Consortium (PDSEC). Dr. Kim's research focuses on design informatics; design science; sustainable design; collaborative product development; and design and manufacturing of soft products. Dr. Kim has received external funding from several U.S. federal agencies including NSF, NIDRR, VA, DOD, and Department of Energy, the Korean Ministry of Knowledge Economy, and industries including Ford and GM. He has published over 50 journal papers and conference papers in proceedings and numerous technical reports and presentations. Currently, Dr. Kim is a planning site director for the NSF Industry and University Cooperative Research Center (I/UCRC) for e-Design. Dr. Kim's education includes a Ph.D. in Industrial Engineering from University of Pittsburgh.

Michael Lederle, MSIE began his career in government service nearly two years ago, as a Program Analyst intern with the System Redesign section at the Detroit VAMC. In May 2011, he was given the privilege to fulfill the duties of Industrial Engineer for the VA-CASE VERC. In both positions, he has worked with clients to address their data acquisition and manipulation needs, provided expertise and guidance in Lean Six Sigma principles, and serves as a liaison between the VA-CASE and research groups here in Detroit working to improve the care of veterans within the VHA system. Michael has trained for and received degrees in Mathematics and Industrial Engineering from Wayne State University, and is currently pursuing graduate work with the Statistics department at Texas A&M University.

Nancy J. Lightner, PhD is an Industrial Engineer working in the Patient Care Make/Buy area. She is developing and supporting tools to assist in the decision to provide specific care to Veterans (dialysis, gastroenterology services, polysomnography, and stroke care) or to outsource the care to non-VA facilities. Prior to joining the VA in September 2011, Dr. Lightner spent ten years in higher education, teaching software development principles and publishing articles related to human factors in software design and the software engineering profession. She has also worked as a software engineer and project manager in various industries, including defense, healthcare, and insurance. Dr. Lightner holds a B.S. degree in Computer Science from the Indiana University of Pennsylvania and an M.B.A. from The Pennsylvania State University. She also earned an M.S. in the Human Factors area of Industrial Engineering and a Ph.D. in Management Information Systems from Purdue University. She is active in several international conferences that integrate research with applications in industry.

Ms. Xiaoyu Ma is a PhD. Candidate from Industrial & System Engineering Department of Wayne State University. She has M.S. in Computer Secience, B.S. in Electronic Engineering and 7 years of experience developing the structure of business-IT systems. Her main interests include operational decision support for RFID-based visualization management, smarter facility design, real-time healthcare workflow management.

Ms. Ma played a key role in developing the strategy and roadmap for implementing real-time locating systems (RTLS) into VA pilot facilities, including customers' requirement discovery, clinical process optimization, technology selection and Return-On Investment (ROI) evaluation. Her paper 'RTLS-based ubiquitous healthcare system design and implementation' has been published as WHITE PAPER in 'RFID Journal', the world's leading source of RFID news and insights. She was invited as a speaker for two presentations about a roadmap to adopt RTLS in hospitals and ubiquitous control for emergent room flows in VERC Symposium, 2011. By integrating RFID and SOA-based workflow management system, she proposed an infrastructure about RFID-based healthcare workflow management system (RHWfMS) to provide a transparent business process management in hospital. It aims to facilitate the flexibility and adaptability to deal with dynamic medical demands and operations. Her two papers 'RFID-based healthcare workflow management system in sterile processing department' and 'Real-time Operation Room Workflow Management' will be presented in Industrial and Systems Engineering Research Conference (ISERC 2012), the premier event for the world's leading industrial and system engineers.

Leslie Monplaisir, Ph.D., Department Chair of Industrial and Systems Engineering at Wayne State University. He received his B.S. in Engineering from University of the West Indies in 1987, M.S. in Computer Integrated Manufacturing from the University of Birmingham England in 1991. He completed his Ph.D. degree in Engineering Management from the University of Missouri-Rolla in 1995.

Robert Morgan is a Programmer/Developer for VA-CASE. Rob is currently completing his degree in PC Support and Administration and holds certifications from CompTIA and Microsoft including A+, Network+, SharePoint, Windows Server, and Windows Client OS. Rob's previous experience before joining the VA includes thirteen years in the manufacturing sector as Quality and IT Manager focusing on the implementation of Lean principles and implementing document control systems through SharePoint services. Rob's primary duties at the Indianapolis VA include designing SharePoint sites for the facility and technical support for the Interactive Visual Navigator (IVN) project. Rob served in the US Army and is a Veteran.

Alper Murat, Ph.D., Assistant Professor at Wayne State University received his B.S. in Mechanical Engineering and M.S. in Industrial Engineering degrees both from Bogazici University/Turkey in 1998 and 2000. He completed his Ph.D. degree in Management Science/Operations Research from the McGill University/Canada in 2006. His research interests include application of optimization modeling and simulation techniques and data mining in the fields of supply chain management, logistics and transportation, product development, quality, reliability and healthcare. He has worked with Ford Motor Company, General Dynamics, Henry Ford Health Care Systems and Veterans Engineering Resource Center (VERC) on various applications of operations research and simulation tools and techniques.

Hakimuddin Neemuchwala, BSIE is an Industrial Engineer with the VISN 11 VERC in Detroit, Michigan since 2009 and has 3+ year of professional experience in manufacturing and healthcare. He is currently involved with the *Operating Room Utilization Simulation*, *Cancer Care Collaborative and SPD* projects. He was also involved in *Pharmacy Pending Order Reduction*, *Hemodialysis*, and *Reusable Medical Equipment* projects at Detroit VAMC. Hakimuddin has experience in simulation, operation research, process

analysis and optimization. He has also helped teams and organizations with developing and implementation of processes. Hakimuddin graduated with Bachelors in Industrial Engineering from Wayne State University in 2008. Currently he is pursuing his Masters in Lean Operations from Wayne State University and is expected to graduate by December 2011. He is a Six Sigma Green Belt Certified and is a member of Institute of Industrial Engineering.

John Newton is a Student Trainee working with the VA Center for Applied Systems Engineering. John is currently pursuing his undergraduate degree in General Studies while fulfilling the requirements for entrance into medical school. With the VERC, John has participated in several projects including the recent development and maintenance of electronic libraries for the department. John is also a Veteran of Operation Iraqi Freedom, and has completed several years of service in the United States Army Reserves.

Jarrod Otter is a student intern working at with VA-CASE at R.L. Roudebush VAMC in Indianapolis. He is currently assisting with the implementation of the IVN system in selected VHA facilities, conducting validation checks of the Work Instruction Modules (WIM) and assisting the WIM Librarian. Jarrod also collaborated in the gathering of information and the creation of the SRD Website. Jarrod is attending IUPUI, majoring in Mechanical Engineering Technology (MET) with a Motorsports Technology Engineering Certificate (MSTE). He will graduate in December 2012, and is a charter member of Sigma Alpha Epsilon (SAE), a nationally recognized fraternity.

Khalid Saeed, PhD is Professor of Economics and System Dynamics at the Worcester Polytechnic Institute, where he also directs undergraduate and graduate programs in system dynamics. He has previously held faculty positions at Asian Institute of Technology, Bangkok; Curtin University, Australia; Dartmouth College, NH; Northeastern University, Boston; Lulea Technical University, Sweden; and Lahore University of Management Sciences, Pakistan. He has worked as a consultant, among other organizations, with US Health Resources and Services Administration, United Nations, Asian Development Bank, World Business Council for Sustainable Development, Booz Alan Hamilton, and McKinsey & Company. Khalid Saeed holds a Ph.D. in System Dynamics and Economic Development from MIT. He has written two books and numerous articles on economic development, management and environmental agendas using system dynamics modeling. He received Jay Wright Forrester Award for his work on sustainable economic development in 1995 and has served as President of System Dynamics Society and Associate Editor of *System Dynamics Review*.

Shyamprasad Velumani, MS is a Wayne State University graduate with a Master's Degree in Industrial Engineering and a Bachelor's Degree in Mechanical Engineering from Anna University. Shyamprasad is currently working as an Industrial Engineer with Six Sigma Green Belt in the VA Medical Center VISN11 VERC. He is involved with the Operational Management Optimization and Supporting Tools in Supply, Processing and Distribution (SPD). Previously while working for the Detroit VA medical center he developed a simulation model to improve the patient flow in the Emergency Department. He has been working as an Industrial Engineer Intern for two years at Goodwill Industries of Greater Detroit and ASW

Global (Sam's Club Distribution Center) and gained experience in the field of manufacturing and logistics.

Kai Yang, Ph.D. is a Professor in the department of Industrial and Manufacturing ,Wayne State University. His areas of expertise include Six Sigma, statistical methods in quality and reliability engineering, lean product development, lean healthcare, and engineering design methodologies. He is a well known world-wide expert in the area of Six Sigma, Design for Six Sigma and quality for service and an author of five books in the areas of Design for Six Sigma, Six Sigma and, multivariate statistical methods. Prof. Yang's book, *Design for Six Sigma* is an influential book that provides a framework to integrate both innovation methods, and traditional statistical quality assurance methods into the product development process. Dr Yang has also published over 70 research papers. He has been awarded over 40 research contracts from such institutions as US National Science Foundation, US Department of Veteran Affairs, Siemens Corp, General Motors Corporation, Ford Motor Company, Chrysler Corporation and Siemens Corporation.

Dr Yang is also a well known trainer in the area of Six Sigma, lean, he has conducted numerous training for many companies, such as Apple Computer Inc and Siemens. Dr Yang is the leading faculty member in VERC and ICG of VA representing Wayne State University and led many projects to success. Dr. Yang obtained both his MS and PhD degrees from the University of Michigan.

Serge Yee, B.S.E., J.D. is currently a project manager in the VA Engineering – Technical Assistance Program (VE-TAP). Mr. Yee manages the Interactive Visual Navigator (IVN) project at the John D. Dingell VA Medical Center in Detroit, MI, and will continue to manage development as IVN is extended to 20 VHA facilities. Prior to joining VA, Serge was a subcontractor working through Wayne State University, also in Detroit. Mr. Yee holds a B.S.E. degree in Industrial and Operations Engineering from University of Michigan – Ann Arbor, and a J.D. degree from Wayne State University Law School.

Former VA-CASE Staff/Faculty

Sally Bowden, CQE, CSSBB, is the President of Samco & Associates, Inc. Sally has over 20 years experience in the quality and regulatory field in medical devices, automotive, education and health systems. She has served in executive positions as Vice President of Quality and Process Improvement at Ventana Medical Systems and as Vice President of Quality and Regulatory Compliance at Roche Diagnostics Corporation. She has served as an Associate Professor for Purdue University School of Engineering and Technology, Indianapolis where she developed the Quality Management Curriculum within the Mechanical Engineering Technology department. Sally is a graduate of Purdue University School of Engineering and has also achieved her MBA. Her experience includes working with organizations to not only develop systems to meet specific local and global requirements, but also to re-engineer them for efficient, effective compliance.

Michael Chabie, BSIE is an Industrial Engineer with the VISN 11 VERC in Detroit, Michigan. He is currently involved with the FBCS Optimization project. Michael's career has included opportunities from

the manufacturing and service industries. Michael's manufacturing experiences include quality and design testing, while his service industry experience have ranged from health care insurance to banking. Michael's specialty is work flow optimization, process analysis and improvement. Michael holds a Bachelors degree in Industrial Operations Engineering and an MBA from the University of Michigan.

Archana Dube Ph.D., received her Ph.D. degree in Health Economics from the University of Pittsburgh. She holds a full time position at Indiana University-Purdue University of Indianapolis and an adjunct position at the School of Medicine. Archana is the undergraduate advisor in the department of economics at IUPUI.

Her area of expertise and interest lies in the delivery of health services and costing analysis. Archana has several university grants to her credit and has received the prestigious trustees' excellence in teaching award twice at IUPUI. She is currently working on the Fee Project and the Make-Buy Analysis at the VA. She is also involved in projects with the Health Services group at the VA in Indianapolis.

Steven M. Hare, MS is currently the Information Technology director for Purdue University's College of Science. With over twenty-five years of IT management and consulting background, Mr. Hare has served as Purdue University's chief information security officer, the Regenstrief Institute's collaborations and IT officer, and as a managing director for an information security research center. He is a principal in KVS Technologies, LLC, an information technology and security firm.

He holds Master of Science degrees in both Applied Mathematics and Industrial Engineering from Purdue University. His consulting efforts span numerous disciplines, with experience in strategic IT design and management, information security architecture, simulation of manufacturing enterprises for process improvement and cost reduction, and course development and delivery.

Wenjia He, MS graduated from Wayne State University with a Masters degree majoring in Industrial Engineering. She received Six Sigma Green Belt Certificate in 2009 and works as Industrial Engineer at Detroit VA Medical Center and VISN11 Veteran Engineering Resource Center since 2009. She is interested in practicing Lean and Six Sigma philosophy and improving the quality of services in health care industry. She has been involved in various projects such as Cancer Care Collaborative 1st and 2nd generation, scheduling process, demand and supply study, clinical waiting time, lung cancer care service, clinical missed-opportunity improvement, and performance measurement system.

Jennifer C. Hoffman, M.P.H., is currently the VA-CASE Purchase Care Program Manager. Building from her experiences as the Policy and Grant Management Director at the Indiana State Department of Health, Division of Grants Director Office of the Lt. Governor, Jennifer brings a keen understanding of government processes. Her public agency experience has facilitated the advancement of a Fee Service Evaluation project working to advise the Chief Business Office on effective claims processing strategies. As the VERC Program Manager, Jennifer draws upon her expertise in communications, policy development and compliance, to move projects from initiation to successful completion.

Theresa Knotts, BSN, RN, CPHQ has extensive experience in performance improvement, risk management, patient safety, corporate compliance, Joint Commission accreditation for hospitals and behavioral health. She also has more than 11 years of executive management experience (Corporate Compliance, Performance Improvement, and Nursing) in healthcare settings.

Theresa had the privilege of playing a leadership role in an organization receiving national recognition by being named the winner of the 2007 Negley Award for Excellence in Risk Management. She also co-authored a certification program on Lean Healthcare and Systems Redesign, which she is currently providing to health systems nationwide. She has been a Certified Professional in Healthcare Quality (CPHQ) since 1991 and completed University of Michigan Lean Certificate Training. As a skilled nurse she worked in medical and cardiac intensive care, as well as the medical floor. She earned her B.S.N. at Indiana University. Ms. Knotts left her position with VISN 11 VERC at the end of Fiscal Year 2010.

Sharon McIlwaine, MBA, has led implementation of process improvement initiatives using lean and six sigma methodologies within two different medical device companies. She created a vision, gained executive management support and deployed the methodologies within commercial business processes, design and development and manufacturing. Sharon has worked in FDA regulated industries implementing new quality systems and improving quality of products while reducing bottom line cost.

Katherine Mysliwiec holds an M.B.A. and a Computer Graphics Technology degree from Purdue University and works in the Information Services department at Purdue University North Central. She has computer simulation experience working on advanced models for Fagen Pharmacy and Biotta Juice. Prior to working at Purdue University North Central, she was a Hazard Mitigation Media Designer for FEMA, designing mitigation publications to support Community Education and Outreach.

Scott P. Schaffer, EdD, is currently an associate professor in the Learning Design & Technology program in the College of Education at Purdue University where he is also the co-director of the Health Informatics and Learning Technologies group within Regenstrief Center for Healthcare Engineering. He received his Ph.D. in Educational Psychology & Learning Systems from Florida State University. Scott teaches graduate courses in learning systems design, human performance technology, and evaluation and his research interests include everyday patient expertise for self-management, and the relationship of team self-efficacy and knowledge-building on performance. Scott is PI on a project funded by the National Science Foundation and PI on a proposal pending with the Health Information Technology program of AHRQ.

Jonathan Swain, MS is a recent graduate of Indiana University holds a Masters degree in Economics as well as Bachelor's degrees in Economics and Business Administration from Marian University. While attending graduate school Jonathan worked as a research assistant in the VA Medical Center conducting data analysis and constructing short-term and long-term forecasts. In addition to academic and professional pursuits Jonathan remains involved at Marian University where he holds a position on the alumni panel and serves as a tutor in upper division economics courses.

Appendix C: Letters of Support from Key Stakeholders

(See attached document)

Appendix D: List of VHA Facility/VISN Office Sites

VA-CASE Program	Collaborative	Informatics	Professional Development	Purchased Care	VE-TAP
Albuquerque, NM VAMC		x			
Alexandria VAMC	x				
Altoona, PA VAMC	x				
Anchorage, AK VAMC			x		
Atlanta, GA VAMC		x	x		
Austin, TX CDW					x
Battle Creek, MI VAMC			x		x
Bay Pines, FL VAMC	x				
Birmingham, AL VAMC			x		
Boise, ID VAMC		x			
Brockton, MA VAMC			x		
Broward, FL VAMC					x
Butler, PA VAMC			x		
Cheyenne, WY VAMC	x				
Cleveland, OH VAMC		x	x		
Columbia, MO VAMC		x			
Columbia, SC VAMC			x		
Columbus, OH VAMC			x		
Connecticut HCS VAMC	x		x		
Danville, IL VAMC			x		x
Dayton, OH VAMC			x		x
Daytona, FL VAMC		x			
Denver, CO VAMC	x		x		
Detroit, MI VAMC	x		x		x
El Paso, TX VAMC		x		x	
Fargo VAMC	x				
Fayetteville, NC VAMC		x			
Fresno - Central Calif VAMC	x				
Ft Wayne, IN VAMC	x		x		x
ministration Center (HAC), Denver Colorado				x	
Helena, MT VAMC			x		
Hines VAMC	x				
Houston,TX VAMC	x		x		x
Hudson, NY VAMC	x				
Indianapolis, IN VAMC	x	x	x	x	x
Iowa City VAMC	x				
Las Vegas, NV VAMC	x		x		
Lebanon VAMC	x				
Lexington, KY VAMC			x		
Little Rock, AR VAMC	x	x			
Loma Linda, CA VAMC	x				x
Louisville, KY VAMC					x

VA-CASE Program	Collaborative	Informatics	Professional Development	Purchased Care	VE-TAP
Madison VAMC	x				
Manchester, NH VAMC			x		
Marion, IN VAMC			x		x
Maryland VAMC	x				
Miami, FL VAMC				x	x
Milwaukee, WI VAMC	x	x			
Minneapolis, MN VAMC	x				x
Montgomery, AL VAMC			x		
Mountain Home, TN VAMC			x		
New Orleans, LA VAMC			x		
New York Harbor VAMC	x		x		
Northampton, MA VAMC			x		
Oklahoma City, OK VAMC	x		x		
Orlando, FL VAMC	x	x			
Palo Alto, CA VAMC	x		x		x
Pheonix, AZ VAMC	x		x		
Philadelphia, PA VAMC			x		
Pittsburgh, PA VAMC	x		x		
Providence, RI VAMC		x	x		
Puget Sound, WA VAMC	x				
S_Texas VAMC	x				
Saginaw, MI VAMC			x	x	x
Salisbury VAMC	x				
Salt Lake City, UT OHI	x				x
San Juan VAMC	x				
Sheridan, WY VAMC			x		
Spokane, WA VAMC	x				
St Louis, MO VAMC					x
St_Cloud, MN VAMC	x				
Syracuse VAMC	x				
Tampa, FL VAMC			x	x	
Togus, ME VAMC			x		
Tomah, WI VAMC			x		
Topeka, KS VAMC	x				
Tucson, AZ VAMC		x	x		
VA Boston HCS (Jamaica Plain)	x		x		
VISN 1 (Bedford, MA)			x		
VISN 10 (Cincinnatti, OH)			x		x
VISN 11 (Ann Arbor, MI)	x		x	x	x
VISN 15 (Kansas City, MO)			x		
VISN 18 (Meza, AZ)			x		
VISN 2 (Albany, NY)			x		
VISN 3 (Bronx, NY)	x		x		
VISN 8 (St_Petersburg, FL)			x		
VISN12 (Chicago, IL)			x		
Wash DC RTLS PMO					x
Washington, DC VAMC	x		x		
West Palm Beach VAMC	x				
White River Junction, VT VAMC	x		x		